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A

PRACTICAL TREATISE

ON THE

DISEASES OF CHILDREN.

BY

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PREFACE

TO THE FIFTH EDITION.

OWING to the comparatively short time which has elapsed since the appearance of the last edition of this work, it has not been thought necessary to introduce any extensive changes in many parts of the text. All of it has, however, been subjected to careful revision, and such modifications made as were called for by changes in our own views, or by the results of the recent researches of others. In addition to this, several important articles have been almost entirely rewritten; among which may be mentioned that on the Diseases of the Heart; on Progressive Muscular Sclerosis; on the treatment of Scarlet Fever, and of Measles; on Variola, and on the Vaccine Disease.

Some of the articles which seem appropriate in a systematic work on the diseases of children, but which were unavoidably omitted in the last edition, have been supplied. Among these will be found articles on Pulmonary Emphysema, Pneumothorax, Affections of the Tonsils, Retro-pharyngeal Abscess, Malarial Fevers, and Scrofula. To obviate the increase in the size of the work necessitated by these additions, most of the illustrative cases, the number of which has been considerably increased, have been placed in smaller type, and in many places the former text has been condensed. Despite these changes, however, an increase of ninety pages has resulted from the large amount of new matter added. On the whole, it is felt that the hope may reasonably be entertained that the work in its present form will prove of more practical utility than heretofore, and will continue to serve the purpose, which has actuated its authors, of facilitating the study and treatment of this interesting and important class of diseases.

PHILADELPHIA, January, 1874.

PREFACE

TO THE FOURTH EDITION.

It has been some years since the third edition of *Meigs on the Diseases of Children* has been exhausted; and the frequent inquiries which have been made for the work, as well as the increasing interest taken by the profession in the study of the diseases of childhood, have led to the belief that the publication of a new edition would be received with the same kind favor which has been already extended to the three former ones.

The changes and additions which were necessitated by the great advance made during the last decade in our knowledge of a number of the diseases of children, as well as by the unavoidable omission of any consideration of several important subjects in the previous editions of this work, were, however, of so extensive a character that it has been found necessary to associate a collaborator in the preparation of the present edition.

Among the principal of these changes may be mentioned the great enlargement of several articles, and especially of those on thrush, convulsions, chorea, tracheotomy in croup, and parasitic skin diseases. Other articles have been entirely rearranged, or even rewritten, as those upon the diseases of the stomach and intestines, and upon eczematous affections. In addition to such changes, however, there have been no less than seventeen full articles added, embracing the following important subjects: Diseases of the heart, and cyanosis; diseases of the cœcum and appendix vermiformis, and intussusception; chronic hydrocephalus, tetanus, atrophic infantile paralysis, facial paralysis, and progressive paralysis with apparent hypertrophy of the muscles; rheumatism, diphtheria, mumps, rickets, tuberculosis, and infantile syphilis; typhoid fever; and sclerema. These various additions and changes have involved the introduction of more than two hundred pages of new matter. Several extensive tables, exhibiting the mortality in this city of some of the most common and fatal diseases, in connection with the variations of temperature, have been prepared with great care from the records of the office of the Board of Health, which were opened to examination through the courtesy of Mr. Chambers, the Chief Registration Clerk of that office. A copious index has also been supplied, which it is trusted will facilitate reference, and render the work more practically serviceable.

Apart from these changes, however, no alteration has been made in the general plan of the work. As in the composition of the previous editions, the best and most recent foreign and domestic authorities on the diseases of children have been frequently and carefully consulted, and their views fully quoted whenever they appeared of practical importance. For the most part, however, the opinions expressed in the following pages are those to which the authors have been led by their personal observation, and which they therefore believe to have been approved by the most searching of all tests, that of practical application.

It has also been their constant aim, while supplying a sufficient amount of information upon questions of etiology, pathology, and morbid anatomy, to insure a practical character to the work. With this view, an unusual amount of space has been devoted to the discussion of the treatment of the different diseases, and in every instance the conclusions derived by the authors from their own experience have been fully, and, it is hoped, clearly stated.

In so doing, it has been necessary to consider somewhat at length the extremely important questions of the employment of venesection, antimony, calomel, and stimulants; and a full expression of opinion upon each of these points will be found in its appropriate place.

In conclusion, the authors would venture to express the hope that their efforts may have been successful in furnishing a work which will aid in rendering the study of the diseases of children more attractive and clear, their recognition more easy, and which may serve as a practical guide in the difficult task of treating these disorders.

PHILADELPHIA, February, 1870.

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A
PRACTICAL TREATISE
ON THE
DISEASES OF CHILDREN.

INTRODUCTORY ESSAY.

ON THE CLINICAL EXAMINATION OF CHILDREN.

THE clinical examination of children, and particularly of young infants, cannot be successfully practiced upon the same method as that habitually made use of in the case of adults. The truth of this statement will be readily assented to by all who have had much experience in the treatment of the diseases of the two ages, by those who will reflect for a moment on the great differences in the expressions of the various organs in early and adult life, and by those who are acquainted with the opinions of distinguished writers upon children's diseases. It is proper and useful, therefore, to preface a practical work on the diseases of children, with a sketch or plan of the best method to be pursued in forming a diagnosis of these diseases, and with remarks upon the physiological characters which distinguish the organization of early life from that of maturity.

The difficulties that beset the path of the practitioner in his clinical examination of children are so great that he who has not been prepared by preliminary study to surmount these obstacles, will find it a most uncertain and dubious task to unravel the history and nature of any case that may be set before him. The helpless silence of the infant,—the wilful silence, or the loose and inconsistent answers of the older child, which lead astray the mind rather than guide it to true results,—the agitation and fright produced by the examination, rendering it impossible at times to ascertain the real state of the different functions of the economy,—and, lastly, the difficulty of obtaining accurate and reliable accounts of the history of the case from the attendants, all combine to make the duty of the physician most perplexing, and, unless he be gifted with a large share of patient and philosophic calmness, most irksome and trying to the temper. So great, indeed, are the difficulties encountered by some practitioners who enter upon this branch of the practice of medicine without proper preliminary preparation, that they never overcome them; but, to use the words of Dr. West, "grow satisfied with their ignorance, and will then, with the greatest gravity, assure you that the attempt to understand these affections is useless." That it is possible, however, to overcome, in great measure, these obstacles, and to arrive at a correct diagnosis in nearly all cases, is quite as true as that these obstacles really exist. But, in order to do this, the physician must first be aware that difficulties exist, and must have formed in his mind some plan or method by which to surmount or elude them.

Before proceeding to show what is the best method of examining or exploring disease in children, we must state that our remarks apply chiefly to infants and very young subjects; for, after the age of eight and ten years, the physical and intellectual development have progressed to such a point as to render the method of diagnosis nearly the same as that employed in adults.

The chief causes which render the diagnosis of disease in young children difficult, are the absence of the faculty of speech, and the violent agitation generally caused by the examination, which prevents a proper appreciation of the state of certain organs and functions.

It is easy to understand how much our means of diagnosis are restricted by the absence of the faculty of speech. How many symptoms are there in the case of adults with which we become acquainted only through the patient's own account of his sensations; and, consequently, of how many must we be deprived in children by the absence of this account! It might, indeed, at first view, seem impossible to detect the nature of the sickness without the assistance of this means, so greatly do we depend upon it in our examinations of adults. Nevertheless, we shall find ourselves enabled, by an attentive consideration of other resources in the child, by a close study of its physiognomical expression, its decubitus, the nature of its cry, and by the most rigidly careful physical examination, to form our conclusions with almost as great a degree of precision as in older patients.

The other causes of difficulty,—the violent disturbance, both physical and moral, of the child, its fright, agitation, and cries,—constitute, when they are present in a high degree, much greater embarrassments than the want of speech. To overcome these, the physician must use all his skill, tact, and patience; for, unless they can be avoided by art, or overcome by soothing and gentle persuasion, he can learn but little that will be of essential service to him in making up his opinion. He can neither read the countenance of the little patient, nor judge by its attitudes or decubitus of the state of the various organs, whether internal or external; he will be unable to ascertain the rate, force, or regularity of the circulatory or respiratory functions; he cannot, to any useful purpose, examine the abdomen, to learn whether it be tender on pressure, or whether its contained organs be in their natural condition as to size and position; and, lastly, he will find that the physical exploration of the lungs and heart, by auscultation and percussion, yield him at best only imperfect results.

To avoid the difficulties just detailed, it is always useful, if not absolutely necessary, to conduct certain portions of the examination whilst the child is calm and quiet, and certain others whilst it is disturbed and agitated. This distinction of the examination into two periods, or stages, is one of the utmost importance in a practical point of view, and should never be forgotten by the physician during his clinical observation of the various symptoms the patient may present.

By the period of calm is meant a condition of total quiescence, in which the child is undisturbed either by internal or external causes of irritation. This condition is best found in the state of sleep. If this cannot be obtained, the one most nearly approaching to it is that which exists during the act of nursing, or which follows that act. Suckling is usually followed, even in the sick child, by a condition of drowsiness or by a gentle and languid slumber, during which it will allow a careful examination upon many points without agitation. If possible, therefore, the physician should always see the child when asleep, and if the mother or nurse propose, on the occasion of his visit, to hurry up stairs to prepare the child, or to bring it down into the parlor or lower room, he should ask, as a favor, that he may see it asleep.

If, in spite of having just been nursed, the child be awake and fretting, and when, also, it is more advanced in age, we should endeavor, by the attraction of toys, by gentle and soothing words and manners, by fondling, or by having it carried about the room, to get it quiet.

Before proceeding to a consideration of the particular means by which we are to judge of the state of health or sickness of young subjects, it is proper to call attention to the great importance of a careful examination of the attendants, in regard to the history of the case, previous to and between the medical visits. In the instance of children, their inability to describe their own symptoms compels us to depend entirely upon the mother or nurse for all detail of the case previous to our first visit, and for all accounts of what may have happened between two subsequent ones. It is, therefore, extremely important that this part of the examination should be conducted with every care and caution. Very much that is useful may be learned from it, if it be well managed. A great deal of skill and art are required in putting the questions, and in sifting the evidence thus collected. We should always bear in mind the character of the persons questioned. Much depends upon their education, and much more on their natural powers of observation, and manner of relating what they may have seen. The degree of credence to be attached to their answers must rest upon their probable intelligence. Nurses and mothers will often give accounts of their charges which must be received with large allowance, and even in some few instances with disbelief. We would, however, in this place, most earnestly caution the young practitioner of medicine to be very careful not to misbelieve, or even mistrust, without well-poised reasons, the account of a sick child given by a mother; for though a foolish, weak woman will often give a false or exaggerated statement of the symptoms of her child, an observant and intelligent, and sometimes a foolish and weak one, when guided by maternal instinct, will detect variations from the healthful condition of a child, which may entirely escape the search of the most acute and rigorous medical observer. A mother may perceive a change in the expression of the face, in the manner of the muscular movements, in the temper or conduct of her child, which shall fail to attract the attention of the practitioner; or it may be that the symptom which has caused the parent to take alarm occurs only during the absence of the physician. The medical attendant ought, for these reasons, to listen patiently and kindly to whatever the mother or nurse may have to say, and if unable to detect immediately what they assert they have seen, let him not determine at once that there has been a mistake, that their anxiety has deceived them; but let him examine the patient yet again, and more carefully, or let him pay another visit to learn whether the symptom or symptoms continue, or have occurred again. Our own rule, in a doubtful case, is to listen with religious attention to the mother, and unless she be far beneath the average of human intelligence, our opinion as to the fact of some deviation from the ordinary health of the child is considerably influenced by what she tells us.

The inquiry in regard to the history of the case, previous to the first visit of the physician, should bear particularly upon the causes of the sickness, its precise moment and mode of attack, and its course and symptoms up to the present time. The most important points to be considered in connection with these objects, are the health of the parents, including their ordinary health, or their habitual diseases, the causes and periods of their death, if they are not living, and the state of health of the child at the moment of birth and since. The hygienic conditions in which the patient has been placed ought always to be investigated; the place of habitation; the kind of house, and whether a large well-ventilated room, or a small, narrow, and close one; the clothing; the food; and lastly, whether the infant has been suckled, or brought up on artificial diet. The state of the health just anterior to the attack ought always to be examined into. Has it been good and strong, or feeble and delicate? If delicate, what diseases? If the approach of any of the eruptive fevers be suspected from the character of the symptoms, the question as to whether the child has previously had measles or scarlet fever, or has been vaccinated or had variola, should always be asked.

It is next necessary to fix as accurately as possible, the precise period of the onset of the sickness. If the question, "When was the child taken sick?" be asked, as it usually is, the answer will be, "Oh, several days ago," or, "I don't recollect exactly—I think yesterday, or the day before," or some such loose answer. The best way to learn the exact period in a recent case, is to go back, day by day, or else to inquire as to some particular day. We may ask, was the child quite well day before yesterday; was it well last Sunday? did it play and amuse itself? was it as gay and good-tempered as usual yesterday, or the day before, or the day before that? Did it sleep well night before last, or the night before that? A sick child never scarcely sleeps well at night, and very often we may learn by close inquiry into this particular, the exact time at which the attack began. In this way, by forcing the attendant to tax her memory, and to go minutely over the events of the several days previous, we shall nearly always succeed in fixing very precisely the moment of onset.

Having determined these points, we should proceed to inquire in regard to the course of the disease prior to the first visit. This is to be done only by patient and repeated questioning. The questions must be so framed as to elicit free and unbiassed answers. They should be general, and not leading. Lastly, we are to inquire into the treatment of the case up to the present time.

It is best that all these interrogatories should be made previous to seeing the child, in some other room than the nursery, in order to avoid the risk of alarming the child by the presence, during an unnecessary length of time, of a stranger. If, however, the child be well acquainted with the physician, it matters not where the inquiries are made.

Having now obtained from the attendants all the information they can give in regard to the history and nature of the case, the physician must proceed to the personal examination of the patient, in order to determine, by his own observation, the exact nature of the sickness, and the treatment it may require.

The most important points to be attended to during the clinical examination, are the countenance or facies, noting its expression, coloration, the presence or absence of furrows and wrinkles from pain, from emaciation, or from disordered muscular action, the appearances presented by the nasal orifices, and especially by the alæ nasi, and the characters exhibited by the mouth; the sleep; the cry; the state of embonpoint or emaciation; the condition of the skin as to coloration, temperature, moisture or dryness, the presence of swellings of any kind, such as those produced by dropsy or by affections of the joints, and the existence of eruptions; the pulse; impulse of the heart; the respiration; the signs furnished by the state of the mouth and throat, and by the disposition towards and power of sucking, or by the manner in which drinks are taken; and lastly, the state of the abdomen.

THE COUNTENANCE.—The countenance of a young and healthy infant, who is sleeping or perfectly quiet, wears no expression except that of comfort and content. It is composed and still; no movement disturbs its innocent tranquillity, unless, perhaps, some gentle smile light it up from time to time, when we might well believe the happy superstition of the fond mother, who will tell us that angels are whispering it. In sickness, even when slight, the countenance soon loses this expressionless character. In all acute disorders the alteration is very great, such indeed as to strike the most careless and inexperienced observer. The features become contracted, furrows and wrinkles appear about the forehead, the nostrils are dilated, or pinched and thin, and the mouth becomes drawn and rigid. The extent of the change is generally in proportion to the severity of the attack. The part of the face most altered will depend very much upon the particular system of organs implicated in the disease.

Some authors have endeavored to show that different diseases give to the physiognomy certain peculiar and characteristic *expressions*. This is true only to a certain extent. Thus, the facies is very different in abdominal from that observed in thoracic or cerebral diseases; but though it is *generally* easy for a practiced physician to distinguish by the facies alone between a cerebral and thoracic disorder, it is quite impossible for him to distinguish between any two cerebral, thoracic, or abdominal affections. The particular changes impressed upon the face by different diseases cannot, however, be discussed in this place, but must be considered in the separate articles upon each disease. Here it can only be stated in general terms, that, in diseases of the brain, the upper part of the face, the forehead, and the eyes are chiefly affected; that in diseases of the thoracic organs, the middle portion of the face, and especially the nostrils; while in those of the digestive organs, the lower part of the face, the mouth and lips, are the parts which undergo the greatest changes in their expression.

Pain may almost always be detected by the expression of the face. It gives to the countenance various shades of expression, according to its degree of severity, and its permanency or recurrence at intervals. Pain in the head is said, by Dr. M. Hall, to produce a contracted brow, pain in the belly to occasion an elevation of the upper lip, whilst pain in the chest is chiefly denoted by sharpness of the nostrils. We doubt, however, whether pain in any particular organ imparts an expression to one part of the face rather than to another, for indeed pain in any part of the body, whether the head, chest, abdomen, or limbs, gives rise to a contraction of all the features. Not one part of the face alone, but the forehead, mouth, nose, and the whole face, become changed in expression and contracted, when there is severe pain in any part of the body, so that we deem it impossible from the expression alone, to determine where the painful sensation may be seated. The countenance merely tells us there is pain, but not where it is located. The painful expression will be permanent or occasional, as the pain itself is constant or only paroxysmal.

The *coloration* of the face becomes often an important means of diagnosis. In all the fevers, phlegmasiæ, and diseases of general excitement, the face will be more or less suffused and red, unless the attack be so severe as to occasion a violent shock to the nervous system, in which event the countenance instead of being suffused, is paler than natural. In such cases the face becomes of a dead white, all traces of red disappear, and the skin at the same time has often a slightly shining or varnished appearance. We have not unfrequently observed this symptom in pneumonia and bronchitis, and also in the latter stages of true croup. It is a very striking phenomenon, and one which portends great danger.

In chronic cases of all kinds in which the hematosic and nutritive functions are enfeebled, the face assumes a pallid and waxen hue, which is very characteristic. In the various digestive ailments it becomes icterode or sallow, and in affections of the liver more or less yellow. Lastly, in certain diseases and malformations of the heart or lungs, it becomes bluish or livid, constituting one of the most important signs of what is called morbus cœruleus, blue disease, or cyanosis.

In reading the countenance of a sick child, the practitioner should always notice the play of the nostrils, since this reveals, to a certain extent, the state of the lungs. In pneumonia, bronchitis, and pleurisy, the movements of the alæ nasi become rapid and energetic, expressing, by the degree of their violence and extent, the amount of embarrassment under which the respiratory function is laboring.

The nostrils and nasal passages should always be examined also to ascertain the presence of mucous or purulent secretions, or of pseudo-membranous deposits, since these fluids or their inspissated products interfere more or less with the free passage of air through those canals.

Of the Sleep.—Much useful information as to the state of health of infants and children may be obtained from a careful consideration of the various phenomena connected with their sleep. Of this we are fully convinced from somewhat long and patient observation. We cannot ascertain, indeed, the nature of the disease under which the child may be laboring, but we can detect, with very great certainty, the existence of a deviation from health. We know of few more certain means of fixing the period at which any attack of illness may have begun, than by inquiring at what time the child began to have restless or broken sleep, or insomnia.

A perfectly healthy infant, within the month, who is suckled at an abundant and wholesome breast, will usually sleep twenty out of the twenty-four hours, waking to nurse every two or three hours during daylight, and twice or three times during the night. After the age of two or three months, the child is much more wakeful during the day, though it will still take a nap of two or three hours in the morning, and a shorter one in the afternoon, while it will sleep from early evening until the following morning, waking but once or twice to suck. Indeed, many perfectly healthy infants, of between three and six or seven months of age, sleep without waking from nine or ten o'clock in the evening until six the next morning. After the latter age the sleep is seldom so unbroken; the child begins to undergo the first considerable trial to its health, dentition, and it is rendered thereby more or less ailing and irritable, and consequently restless and troublesome at night.

Children who have passed through the epoch of dentition, and who are *perfectly well*, usually go to sleep soon after being put to bed, and never wake until the following morning. Not only so, but they sleep soundly and quietly, without being disturbed by slight sounds, and without tossing or turning much in their sleep.

In healthful sleep the whole appearance of the child, its expression of countenance, its attitude, and its breathing, all declare a most perfect and beautiful ease and tranquillity. Nothing can be more suggestive of the comfort and well-being that naturally attend upon health, than the perfect composure and graceful postures exhibited by a hearty child during profound sleep.

It needs, however, but a slight disturbance of the health of a child to break in upon its ordinarily calm and peaceful sleep, and to render this restless, fitful, interrupted by startings, cries, or dreams, or insufficient. The most trifling irritations, as the pressure of a tooth against the gum, the presence in the digestive canal of a little imperfectly digested food, or of one, two, or three lumbricoides, or the slightest fever from any cause, are sufficient to produce this effect, and hence it is that the character of the sleep will often become to a watchful practitioner the first sign of disorder held out by nature.

The degree of disturbance of this function will vary with the nature and severity of the disturbing cause. When slight, the child will continue to sleep throughout the ordinary period, but the sleep will be somewhat uneasy. The countenance will be disturbed. There will be contractions of the brow, and momentary workings of the features, which express the perception of some unhealthful sensation. Often the child will toss and turn, and change its position more frequently than natural. Sometimes it will cry out, and appear distressed by some dream or painful sensation. When the cause of disturbance is more serious, the sleep is more broken, the child wakes often, and lies awake for a longer or shorter time, and it becomes very difficult to lull it to sleep again. Or it has painful dreams or nightmare, causing it to scream and struggle in sleep, and then to wake in the most violent affright. In severe instances it becomes almost sleepless. We have very often known teething children not to sleep more than half as much as in health, and to wear out, by the long continuance of this sleeplessness, the patience and even the health of their attendants. In some instances they will no longer sleep in the bed or crib, and the nurse is obliged to get up and walk with them, or soothe them by the movement of a rocking-chair or cradle. In other cases, the derangement of the health is shown by grinding of the teeth, and by the most violent tossing and tumbling about the bed. We have frequently seen a child lying with its head where its feet should be, or across the bed, and with all the coverings thrown off, in spite of the most careful arrangement of the bedclothes.

These various disturbances are therefore signs of some alteration in the health of the child. They do not lead to an appreciation of the precise nature of that alteration, but they are invaluable as affording indications of the existence of some morbid condition of the economy. Very often, as above stated, they are the first symptoms of the approach of some more or less serious sickness, and as such will often enable us to determine, with much precision, the moment of onset of the attack.

THE CRY.—Crying is one of the modes of expression of the child. Indeed, this, with the expression of the face, are, according to M. Billard, the only means of expression with which nature has endowed the young infant. This is, however, scarcely correct, since we may also class amongst its means of expression the various spontaneous muscular movements indicative of uneasiness, or of pain, or pleasure; the manner in which it drinks or sucks, whether eagerly, and with appetite, or languidly, or carelessly, or not at all; the enjoyment it receives from pleasant sounds; and the evident delight it takes in regarding the light. Nevertheless, the cry and the expression of the countenance are the two means on which the physician must chiefly rely for early information of the occurrence of sickness in the young infant. These are the trusty sentinels of nature. By them she first gives notice of the approach of danger, and then measures the amount of mischief that may have been done.

The cry which a child utters during sleep, or even when awake, and when nothing has been done to excite or disturb it, is always indicative of some uneasiness. If the cry be caused by pain, or by any considerable disturbance, it will be accompanied by certain contractions of the features and movements of the body and limbs, which will still more strikingly show that the pain, or other exciting cause, is of a serious nature. Violent and obstinate crying is almost always caused by severe pain,—such as the pain of earache. Indeed, obstinate and long-continued crying, lasting for hours, is rarely met with except from one of two causes, earache or hunger. The cry of earache is often incessant and unappeasable, the pain being generally constant and not paroxysmal, as are most other pains. It is to be silenced only by the application of remedies to the ear, or by the internal administration of opiates. We have known an infant, three months old, to scream with earache for two days and nights, with only short lulls of a few hours when brought under the influence of large doses of laudanum. As soon as the ear began to discharge, the cry ceased. We are constantly called to see infants and young children who have been crying most violently for hours, and who are thought to have colic, or to have hurt themselves, but who are, in fact, tortured with that most violent of all pains, earache. We have met with few instances in which such severe and *constant* crying has depended on other causes; for, though children scream violently and obstinately from hunger and thirst, they may always be quieted by the supply of either want, whilst in earache the infant generally refuses the breast, or takes it only for a few instants, and then lets go to resume his almost automatic scream.

To show the difficulty of sometimes determining the cause of crying, we may mention that one of us once attended a nursing baby through a severe attack of bronchitis. Just as the child was recovering from the attack, it began to cry without any apparent cause. The cry was so constant, violent, and severe, that, feeling certain from the symptoms that it could not be from any dangerous cause, we concluded, by the method of exclusion, though, to be sure, there was neither tenderness of the ear to touch, redness or swelling of the meatus, nor discharge, that it must be an earache. Hot applications and opiates applied to the ears did no good, and the constant scream set the mother half wild. At length, the grandmother came in and said she thought the child wanted the breast. Sure, enough, there was the trouble; the child lay at the breast almost continuously for twenty-four hours, and earache, crying and all, vanished.

In not a few instances we have thus known infants to cry very often in the day and night, and sometimes very obstinately, too, from hunger. In such cases the child is thought to have colic, and as it is not unfrequently costive, it is dosed with cathartics, carminatives, and opiates; or, it is being brought up partially or wholly upon artificial diet, and as a consequence, has some disorder of the bowels, which is thought to require other kinds of medicaments for its relief. When the stools are natural in appearance, or merely costive, and when the child does not labor under flatulence, it is easy, by careful questioning of the mother, to discern whether she has milk enough, and by examination of the size and weight of the child, to judge whether growth and nutrition go on in their proper ratio; and if it be found that the mother is a poor nurse, and that the development of the child is slow and imperfect, we should at once direct an additional supply of nourishment, and the suspension of all mere drugs. We have often been surprised and delighted to find how soon, under the new treatment, the child becomes placid and comfortable, how well and how long it sleeps, and at what a rapid rate it develops its form and size. So, when the circumstances above referred to coincide with a somewhat disordered state of the bowels, we should first choose for the child the diet most appropriate to its age and state of health, and then, if after inquiry it appears that the whole quantity taken in the twenty-four hours is below the proper standard, the amount allowed must be augmented.

The crying occasioned by pain in the head, by the pain which accompanies pneumonia or pleurisy, or that which is attendant upon abdominal inflammations, is never scarcely constant, though it may be violent while it lasts. Pain in the head usually causes a sudden and sharp cry or shriek, which is over as soon almost as heard, and which has been called the hydrencephalic cry. The pain of pneumonia, which, it should be remarked, is not unfrequently absent, or so slight as not to be noticed, commonly occasions crying only during coughing, and for a short time after, and is accompanied by distortion or grimacing of the features. In pleurisy, again, the cry is also heard generally at the moment of coughing, but it is produced also by the act of moving the child, and by pressure on the affected side. It is commonly much louder, shriller, and indicative of greater suffering than in pneumonia, and in some cases that we have seen, has been very frequent and difficult to appease.

The cry of intestinal pain may almost always be recognized by the fact that it takes place just before or after a stool, that it is accompanied by wriggling and twisting movements of the trunk, and especially of the pelvis, or, in very young infants, by its coincidence with more or less flatulence, which is revealed by a tympanitic condition of the abdomen, and by frequent regurgitations of gas.

Children not unfrequently cry much and very obstinately from mere fretfulness and general distress or malaise. This kind of crying may be recognized by its peculiar tone, which is short, sharp, and irritable. It is a fret rather than a scream; it is occasioned by the least disturbance offered to the child, by the attempt to move it, to dress it, to attend to any of its wants, even to look at or notice it; it is moreover possible, generally, to still such a cry by soothing treatment, or by the endeavor to amuse the little thing with toys.

Lastly, a child will sometimes attempt to cry, but is unable to utter any or only a very faint sound. This depends commonly upon some laryngeal impediment, but may be also the result of pure exhaustion; there is not sufficient strength to sound a cry.

The cry of the young child has been divided by M. Billard into the cry proper and the return; and inasmuch as these two portions of the cry are differently affected in different diseased conditions, it is important that we should be aware of their existence, and of the effects produced upon their manifestations by disease.

The cry proper is produced during the act of expiration, while the return occurs during inspiration. The cry proper is sonorous and prolonged, the return is much shorter and sharper. The return is feeble in young infants, and becomes stronger as they advance in age. In different states of health, the mode of crying will vary to a considerable extent. The cry may exist alone, or in combination with the return; or again the return only may be heard, whilst the cry is from some cause suppressed. The distinction between the two portions of the cry may always be distinctly perceived in a child who is crying violently from any recent cause, whether ill-temper, fright, or pain, unless one or other has been suppressed by some morbid condition which interferes with the perfect performance of the vocal function. After a time, however, when the infant has become fatigued with its efforts, the cry proper ceases in part, and we have only the return, which is heard from time to time between the sobs. According to M. Valleix, it is the return which becomes enfeebled and disappears first, whenever one portion only of the cry is heard. Towards the fatal termination of all diseases, the return ceases more or less completely, and the cry assumes a peculiar moaning or murmuring character, which must be familiar to all who have been much in the sick-rooms of children.

With a remark upon the condition of the lachrymal secretion in disease, we shall conclude this division of the subject.

The infant does not begin to secrete tears until towards the third or fourth month, and of course this function can furnish no sign previous to that time. After that period, however, the suppression of this secretion becomes, according to M. Trousseau, a valuable aid to prognosis, as this suppression occurs generally in all dangerous acute diseases. The occurrence of this symptom in any acute case should be looked upon, therefore, as one of dangerous augury, while the continuance of the secretion, or its reappearance after it has been suppressed, is, on the contrary, a highly favorable omen.

General Appearance of the Child; Development; Embonpoint; State of the Skin, Etc.—While occupied in hearing the account of the sickness given by the mother or attendants, and even while asking questions in regard to the present state of the patient, the physician may learn a great deal that is useful by an attentive observation of the general appearance of the child as it lies before him. He should study its size and development, its state of embonpoint or emaciation, its decubitus and gestures, the color, temperature, and dryness or humidity of the skin, and the presence of eruptions or swellings of any kind. Having remarked these various matters during the early part of the examination, he should proceed to inspect carefully the whole external surface by touch and sight, in order to acquire precise and accurate information upon these points.

A child who has been healthy from its birth ought to have attained a certain average size and development at a certain age. If it be much below the average size, if at three months it look like a new-born child, or at a year old like one of six months, it is very clear that something has acted to determine such slow and insufficient growth, and it becomes the business of the practitioner to discover what the impeding cause has been. Not only ought a child to have a certain size and stature, but it should also be possessed of a certain degree of embonpoint. A perfectly healthy young child, one under four years of age, usually presents a much greater fulness and rotundity of the trunk and limbs than does the adult. Its tissues are firm and solid, its surface of a cool and pleasant temperature, its coloration of a clear and exquisite white, finely tempered with a faint rosy tint in a warm atmosphere, or slightly marbled with light bluish spots in a colder air. Few marks more certainly indicate a healthful temper of the constitution than the clear and exquisitely tinted pink color of the palmar and plantar surfaces of the hands and feet of a young child. Nothing, indeed, can be more beautiful or perfect in shape or contour than the figure of a fine hearty young child; nothing more pleasing to the eye than its delicate but vivid coloring; and nothing more expressive of the fulness of health and vitality than its whole appearance.

When, therefore, instead of these marks of a pure and active state of the health, we meet with stunted growth, emaciation, soft and flaccid tissues, sallow and dingy tint of the cutaneous surface, pallid or bluish feet and hands, weak and listless movements,—how easy the conclusion that some jarring agent is at work to hinder and obstruct the machinery of life.

In acute diseases emaciation takes place rapidly, but the tissues still retain some degree of elasticity and firmness. In chronic diseases the emaciation is of course slower, but it is more complete, so that, in some instances, the frame seems to consist merely of the bones wrapped round with a dark and unhealthy skin. The tissues beneath the skin, the cellular, adipose, and muscular, are in great part absorbed, and the skin falls into wrinkles and irregularities on the least movement of the child. In some cases of disease, and particularly in those of the abdomen, the derm loses almost entirely its elasticity, so that when pinched into a fold by the fingers, it retains for some time the form that has been given to it.

The *decubitus* and gestures of the child ought to be noticed. Healthy children are, when awake, almost always in motion. Those who have attained the habit of walking are tempted to active exercise by their various plays and amusements. Infants, though they sleep much more than older children, are also, when awake, constantly moving their limbs; they are seldom still. When asleep they rest quietly and comfortably, generally upon the side, though often upon the back. How different when the child is laboring under disease of any kind. The disposition to movement is gone; the older child insists upon lying on the lap, or in the cradle or bed, and the infant is to be soothed of its crying and fretfulness only by rocking and fondling in the arms. Instead of the free and spontaneous movements of health, we now see only the sudden, impatient, and causeless tossing on the bed or lap, or the constant changing of position, with fretting or complaining, which constitute the *agitation* of sickness; or else the slow, languid and hesitating movements of weakness or prostration; or lastly, the stillness and immobility of stupor or of coma.

There is nothing peculiar about the decubitus of pneumonia or bronchitis except when there is severe dyspnœa, in which case the child, if old enough to select its own position, lies high upon the pillows, while those who are younger evidently prefer to rest on the lap of the nurse, with the trunk and head supported in her arms, and express by crying and agitation their discomfort and uneasiness when placed in the recumbent position on the lap, or in the cradle or crib. We have seen several young children affected with severe bronchitis or pneumonia, who have preferred to any other position that of being held in the nurse's arms, with the front of the chest placed against her chest, and the head hanging over her shoulder. When the dyspnœa is so severe as to produce, by slow degrees, a partial asphyxia and consequent dulness of perceptivity, the child becomes soporous or comatose, and lies usually upon the back, as in diseases attended with prostration of strength.

In pleurisy and peritonitis the decubitus is usually dorsal, and the child dislikes to be moved or nursed often crying violently when touched or disturbed.

In intestinal inflammations the young patient is usually excessively restless at first, and very fretful, unless the attack be grave and threatening, when it often lies still for a time from the prostration of strength which attends violent attacks, but becomes restless, turns and twists in the bed, cries out, and agitates the lower extremities at each evacuation of the bowels.

In the early period of cerebral inflammation there is generally excessive restlessness, and great irritability of all the senses and temper, but as the case goes on, and passes into the stage of coma, the child becomes still and quiet, assuming very often the decubitus called by the French "*en chien de fusil;*" that is to say, on the side, with the inferior extremities strongly flexed, and the arms drawn close to, or crossed over the thorax. This position is especially characteristic of the latter stages of tubercular meningitis.

Extreme restlessness, constant tossing upon the bed, or incessant changing from the arms to the bed, or from bed to bed, is a very bad sign. We have observed it in several different affections; especially in obstinate pneumonia, in long-continued intestinal disorders, and in the secondary inflammations of measles and scarlet fever.

Amongst the gestures most deserving of attention are the sudden starts, attended with cries, which indicate the occurrence of some painful sensation, as that of colic, of stitch in the side in pneumonia and pleurisy, and sometimes of shooting pain in the head. The frequent carrying of the hand to the head, or to the ear, ought not to pass unnoticed, as this is often indicative of headache or earache. So also of the constant application of the hand to the mouth, or the introduction of the fingers into that cavity, which often occurs when the child is suffering the odontalgic pain of dentition. Nor should the physician ever neglect to observe any peculiar and especially any automatic movements of the limbs, and particularly of the fingers or toes. Nature often heralds the approach of a convulsive seizure by certain peculiar muscular movements. The thumbs are drawn into the palms of the hand, and the fingers clasped over them; or the toes are strongly bent towards the sole of the foot, or rigidly extended; sometimes the fingers are for an instant convulsively extended upon the hand and drawn widely apart from each other; or lastly, the muscular movements, instead of being easy, steady, and natural, are badly co-ordinated; they are irregular, uncertain, and tremulous. This latter character, tremulousness and uncertainty, we have often noticed.

The occurrence of paralysis will often be unperceived for some length of time by an inattentive observer. It is to be discovered by the failure of the child to move one limb, whilst the others are more or less agitated, or by taking hold of the limb, and comparing the total want of resistance in it, with a certain stiffness and opposition to movement almost invariably present in the healthful condition.

The state of the cutaneous surface is always important, and ought to be carefully and systematically examined. The points most requiring to be noted are its temperature, dryness or moisture, coloration, and the presence of eruptions or swellings. By the temperature, and dryness or moisture, taken in connection with the rate of circulation, we must judge as to the existence of fever. The inferences to be drawn from the condition of the surface in these respects are the same in children as in adults, and they need therefore no particular consideration in this place.

The coloration of the skin, on the contrary, owing to its great susceptibility to change in certain affections, becomes, in the diseases of early life, of very considerable importance in diagnosis, and deserves therefore some special remarks.

The physician should be aware, in the first place, that the color of a new-born infant is some shade of red, varying from a deep brick-red tint, to one of a much lighter hue. The red appearance fades away usually in about four or five days, and leaves the surface of a yellowish-white, or in some instances of a decidedly yellow color. The yellow color is sometimes so marked as to impose very readily upon an inexperienced person the idea that it must depend on an affection of the liver, or, in other words, that it constitutes a true jaundice. In a very large majority of cases, however, the conjunctiva retains its natural white tint, the digestive functions go on with perfect regularity, there is no fever, and indeed no marks of decided disorder of the health, so that the icterode hue cannot depend, under these circumstances, on any serious lesion of the liver or its appendages, and it is manifestly wrong to regard the case as one of disease, or as requiring any treatment.

Besides the yellow color just described, the cutaneous surface in children, and particularly in those under three or four years of age, very often exhibits different shades of a bluish color, which need some attention. When the whole skin assumes a decidedly blue tint, the case is one of cyanosis or morbus cœruleus, depending on some malformation or disease of the heart or lungs. In severe cases of this kind, the blue color deepens into a purple or even blackish hue. If this appearance last more than a very few days, there can be little doubt that it depends on some malformation or disease of the heart.

It is quite common to observe in new-born and very young infants, a bluish tint of the hands and feet, and of the parts around the mouth, whilst the rest of the body is pale. These appearances depend usually on some obstruction to the pulmonary circulation, as that caused by atelectasis pulmonum, bronchitis, or pneumonia, and they increase, diminish, or disappear, according to the course of the causative malady. In older children, the blue color of the skin is rarely of any considerable intensity, unless the condition has existed from birth, or soon after; but it is not at all uncommon to meet with faint, but quite perceptible shades of that color, depending on the asphyxiated state which occurs in croup, capillary bronchitis, pneumonia, and sometimes in laryngismus stridulus. It is hardly necessary to add, that a very slight blueness of the fingers and toes is sometimes observed in the cold stage of intermittents.

Occasionally we meet with an excessive harshness, aridity, and scurviness, or with a wrinkled appearance of the skin, especially upon the abdomen and thorax. This symptom, when strongly marked, is usually attended with enlargement of the superficial veins of that part, and is then very striking even to a careless observer. It accompanies very generally the abdominal tuberculosis of children, and should not pass unobserved. Though generally indicative of tubercular peritonitis, or of tuberculosis of the mesenteric glands, it is not always so, since in a case that occurred to one of us, and in which it was perfectly well marked, a post-mortem examination showed it to have been caused by a chronic peritonitis, resulting from inflammation and suppuration of the mesenteric glands entirely independent of tubercular disease. The peritonitis had given rise to extensive adhesions amongst the intestines, and the pus had found its way by a tortuous sinus between the intestines into the vagina, through which it was discharged externally.

There is one other alteration in the color of the skin which is deserving of notice in a practical point of view. It is an excessive pallor, occurring sometimes in diseases which obstruct the respiratory function. We have been most struck with it in the capillary bronchitis, or suffocative catarrh, of young children, and in membranous croup. The whole surface assumes a dead white hue, which seems to depend on a total want of blood in the cutaneous capillaries. The nose is white, the ears become white and diaphanous, and the only relief the eye meets with in gazing upon what seems an almost alabaster countenance, is the still pink or bluish lips, the dark eyebrows and eyes, and perhaps a somewhat leaden tint of the circumference of the mouth and of the forehead. In strongly marked cases the whole surface, even of the fingers and toes, exhibits this white or blanched appearance. When this condition has lasted for several hours, or a day or two, the hands and feet sometimes assume a bluish look, which may last until death occurs, or until the attack approaches a favorable termination. This condition of the surface, when occurring in cases attended with obstruction of the respiratory function, has always appeared to us an indication of imminent danger to the patient; and, indeed, when it lasts more than one or two days, it has very generally proved the harbinger of death.

The clinical examination of the cutaneous surface cannot be considered complete until it has been made with reference to the presence of eruptions, of swellings from œdema, of inflammation, tumors, and, lastly, of diseases of the joints. The inquiry in regard to the presence of eruptions is a very important one, from the fact that children are particularly liable to attacks of the exanthematous and other eruptive affections. Many attacks of sickness, beginning with violent fever and other serious symptoms, which would otherwise remain entirely obscure or unexplained, until a much later period from the onset, may be accounted for at an early period by a minute examination of the skin. So, in the latter stages of long and debilitating maladies, in the disorders which follow scarlatina, and in cardiac and hepatic diseases, a proper inspection of the surface will reveal œdematous effusions that might, if this search were neglected or carelessly prosecuted, remain undiscovered. The same remarks will apply to inflammations of the articular cavities, to the swelling of the joints produced by rheumatism, and to some obscure suppurative inflammations in the limbs of children. A most instructive example of the necessity of this close examination, occurred some years ago in the practice of one of us. A healthy male infant, five weeks of age, was seized suddenly with most violent fever, the reaction being not unlike in character that of acute rheumatic fever. The only visible disturbance of the health, to explain this violent attack, was a certain amount of digestive derangement, and for this the patient was treated. After three days of most severe illness, with strong tendency to convulsion, and with some stiffening of the lower jaw, we were asked to look at the right thigh. It was largely swelled, especially in its lower half; it was hard to the touch, and the skin over the outside of the limb, just above the knee, had assumed an inflammatory redness. It was clear that the child had been attacked with an acute inflammation of the deep tissues of the thigh, and that this was now approaching the surface and becoming visible. Careful inquiry now brought to light the fact that the baby, all through the sickness, had cried severely, as though in sharp pain, whenever it was moved, and especially when its napkins were changed. The distress observed when the napkins were being changed, had been ascribed to some smarting from the urine. Had the surface of the child been more carefully examined at an early period, the swelling of the thigh, and the pain on motion, might, no doubt, have been detected then, and the intense febrile reaction, with the nervous symptoms, which were thought too great for simple functional disorder of the digestive functions, would at once have been explained.

It is clear, therefore, that in infants and in children under six or even eight years of age, the physician must depend, in great measure, for information as to the nature of the case, on his own unassisted explorations; and, knowing this, he should leave nothing neglected that may aid him to gauge with accuracy the state of health of the individual before him. He should cultivate a *habit* of minute, systematic, and patient investigation, since, by accustoming himself to such a method in his daily walks, he will assuredly attain, in the end, a tact and sagacity that will not often be at fault.

THE PULSE.—The pulse of the child, in order to be judged of to any real advantage, must be examined during the state of quiet, and, if possible, it should be felt whilst the child is either asleep or dozing. During the waking state a young infant is in such constant motion, that it is very difficult to perceive the pulsations of the radial artery, and impossible to judge of their force or volume, in consequence of the rising and falling of the flexor tendons of the forearm, and because, also, of the natural softness and delicacy of the pulse at that age. In older children, the moral disturbance occasioned by the visit of the physician in most instances, and the irritability and nervousness accompanying the sickness, will either cause the patient to resist the attempt to touch the arm, or else produce so great an effect upon the rate and force of the circulation, as to render very uncertain and unsatisfactory any conclusions to be drawn from the examination. If possible, therefore, the circulation should be examined during sleep. If this be impracticable, the child ought, when still nursing, to be put to the breast, or, when weaned, it ought to be quieted by soothing treatment, by toys, or by the promise of a toy.

It is essential that we should know what is the average of the healthy pulsations of the child, in order to obtain a standard of comparison by which to judge of any departure from that average in disease. Observers have varied not a little in the results at which they have arrived by their examinations upon this point. By selecting those, however, which appear to have been made with the greatest care, and under the most favorable circumstances, we shall, doubtless, obtain an average entirely worthy of confidence. It will be necessary, also, to obtain averages for different periods of childhood, since the rate of the circulation varies to a very great extent at different ages. We shall, therefore, give the rate of the circulation for new-born children (one to ten days old), for the period from four months to six years, for that from six to nine years, and for those from nine to twelve, and from twelve to fifteen years of age.

The average rate of the circulation in very young infants, is from one hundred and one to one hundred and two in the minute, the former being the result obtained by M. Billard in children from one to ten days old, as nearly as it can be gained from his statements, and the latter the one obtained by M. Roger, in infants from one to seven days old (*De la Température chez les Enfants*, Paris, 1844). The physician ought, however, to be aware of the fact that, though the above is the average rate of the circulation at the age mentioned, the pulse may range very much above or below that average, without necessarily indicating a morbid state of the health. Thus, though the average frequency in forty children, from one to ten days old, observed by M. Billard, was one hundred and one, it was less than eighty in eighteen, whilst in fourteen it was between one hundred and one hundred and twenty-five, and in six between one hundred and thirty and one hundred and eighty. All these children, he assures us, presented every mark of good health.

The average frequency of the pulse during the first year may be stated at about one hundred and fifteen; at least such is the result obtained by us from an examination of seven observations by M. Roger of children from four to nine months old. This result, it will be observed, shows that the pulse is not so frequent during the first few days after birth, as it becomes at a somewhat later period, which, moreover, agrees with a previous statement to the same effect made by M. Valleix. This latter author is of the opinion that at seven months of age the pulse is much more frequent than some days after birth, and that it afterwards falls gradually as the child advances in years.

We are not acquainted with any observations upon the rate of the circulation during the second year of life, except those of M. Trousseau, who, according to M. Bouchut (*Manuel Prat. des Mal. des Nouv.-Nés*, p. 133, Paris, 1845), gives as the average between one year and twenty-one months, one hundred and eighteen.

M. Becquerel (*Traité Théorique et Prat. des Mal. des Enfants*, Paris, 1842), gives us the result of his observations upon thirty children, between two and six years of age, during sleep and in the waking state. During sleep the average was seventy-six; in the waking state it was ninety-two.

Between six and nine years of age, the same observer found the average during sleep to be from seventy-three to seventy-four, whilst n the waking state it was ninety. Between nine and twelve years, he average was, during sleep, seventy-two, in the waking state, ghty. Between twelve and fifteen years the rate was seventy whilst e children were asleep, and seventy-two when awake. Roger gives venty-seven as the average between six and fourteen years.

One very striking fact attracts our attention in the above statements: e much greater difference between the rate of the circulation during ep and during the waking state, in very young children, than in those who are somewhat older. Thus, whilst there is a difference of seventeen pulsations in the minute, in the rate of the circulation during sleep and in those who are awake, between the ages of two and six years, the difference under the two conditions mentioned, amounts to only two pulsations in the minute in children that have reached the age of between twelve and fifteen years.

The circulation is somewhat more rapid in girls than boys. This difference should be borne in mind, but as it amounts to only about five beats in the minute, it is insufficient to be of any very decided value in diagnosis or prognosis.

After these specifications as to the rate of the circulation in children, we shall pass on to some general remarks upon the method of the examination of the pulse, and upon some other of its important characters.

M. Bouchut (*loc. cit.*, p. 129) remarks that in infants at the breast "the palpation of the pulse is almost impossible. It may be counted, but its force, feebleness, size and hardness, can scarcely be appreciated; the intermittent character is the only phenomenon upon which no doubt need rest; it is, moreover, the only one of any value." These opinions of M. Bouchut, though true in some degree, are much too strongly stated, for we are quite sure that it is very easy to detect great differences in the force, size, and tension of the pulse of the same child in health and in disease, and of different children laboring under different diseased conditions. These differences can be detected by careful observation from a very early age, and after two months may be readily recognized, when the variation from the state of health is at all considerable.

The intermittence of the pulse above alluded to, should rather be expressed by the word *irregularity*, since the pulse is not properly *intermittent*, but merely *irregular* in its rhythm. This is quite a common feature in the pulse of children, and, be it noted, is much more frequently met with during sleep than in the waking state. M. Becquerel met with irregularity of the pulse in twenty-four of one hundred and fifty children examined during the waking state, and in fifty-five of one hundred and fifty during sleep. It is clear, therefore, that mere irregularity of the circulation, independently of other symptoms, is not a sign of disease, since it was present in one-sixth of those awake, and in a little more than a third of those asleep. It should be observed, too, that the greatest irregularity exists when the pulse is lowest (in sleep). The chief practical bearing of this fact is that we should be careful not to lay too much stress upon the slowness and irregularity of the pulse, as signs of tubercular disease of the cerebral meninges, unless they are observed during the waking state, and in connection with other symptoms; particularly with vomiting, constipation, and severe headache.

Another very important characteristic of the circulation of the child, is its extreme irritability, which causes its rate to vary to an extraordinary degree, even in perfect health. This is the more marked in proportion as the child is younger. The slightest disturbance, whether moral or physical, will cause the pulse to rise in a young child from one hundred or one hundred and fifteen, to one hundred and twenty, one hundred and thirty, or even one hundred and fifty. From this circumstance may be drawn the inference also, that the pulse should always be examined, as before stated, during sleep, or during profound quiet.

There is still another reason which makes it necessary to touch the pulse during sleep or profound quiet. This is, that when the child is agitated, it becomes literally impossible, in consequence of the contractions of the flexor tendons of the arm, and of the movements of pronation and supination, to judge with accuracy the various qualities of the arterial action.

Examination of the Heart.—The examination of the heart by auscultation and percussion ought, and, to be of essential aid in diagnosis, must be performed while the child is still and quiet. It is best made during sleep, especially in infants; when this is impossible, it can be performed with great advantage during the state of quiet that follows nursing, or during that which may often be procured by soothing management, or by taking advantage of the fondness that infants show for a strong light, the view of which will generally suffice to occupy and keep them still.

The sounds of the heart present the same general characters in the child as in the adult. They are, of course, more feeble and more rapid; conditions which make it difficult, in the young infant, to perceive and appreciate any minute change from the healthful sounds. After the age of one and two years, however, when the circulation has become slower and more steady, the signs yielded by the physical examination of the heart become much more valuable and positive; so much so, indeed, as to yield results almost as important as in the adult. The first sound is almost always duller than the second. They succeed each other commonly with perfect regularity, and have the same interval between each in the same child. The cardiac sounds are readily heard by placing the ear over the præcordial region. The extent of surface over which they may be heard will depend on several conditions: particularly the state of quiet or agitation of the child, the presence or absence of fever, the state of the lung as to its consistence (constituting it a better or a worse conducting medium of sounds), and the condition of the heart itself as to health or disease.

In a healthy child, who is undisturbed by any cause of irritation, and particularly in one sleeping, the sounds are distinctly audible over the whole præcordial region and under the left clavicle. In many subjects they can be heard over the whole front of the thorax, but become, of course, feebler in proportion as we recede from the præcordial region. Usually they are heard quite as distinctly under the right clavicle as over the nipple of that side, in consequence, no doubt, of their transmission in an upward direction by the aorta. They are never heard over the posterior walls of the chest in children in perfect health, and whose circulation is entirely undisturbed. In those who are awake and agitated, and in those who have been making severe muscular exertions, the cardiac sounds are very loudly audible over the whole front of the thorax, and even through to the back of the chest.

When the lungs are indurated by inflammation, as in pneumonia, they transmit with great distinctness, from having become better conducting media, the cardiac sounds to the back. This circumstance sometimes becomes a valuable aid in the diagnosis of pneumonia. We have been enabled to satisfy ourselves of the existence of pneumonia in the lower lobe of the right lung, in a doubtful case, from the fact that the sounds of the heart were much more clear and distinct over the right inferior, than over the left inferior dorsal region.

The præcordial region is decidedly less sonorous on percussion than the parts of the thorax directly over the lungs. This diminution of sound is distinct enough to be evident to any ordinary ear, but it rarely amounts to absolute flatness. The region exhibiting this dulness of sound is the same in position as in the older person. It occupies the space corresponding to the cartilages of the fifth, sixth, and seventh ribs, and is situated, therefore, between the left nipple and the left edge of the sternum. Its measurements, as given by MM. Rilliet and Barthez, are one and a half to three inches in a transverse, by one and a half to two and a half in a vertical direction. The region of dulness is described by those observers as being represented by a circle or ellipse, the transverse diameter of which extends from the nipple to the sternum, or more rarely, towards the xiphoid cartilage. In children over six years old, the nipple sometimes lies above the middle line of this space.

THERMOMETRIC OBSERVATIONS IN CHILDREN.—As an indication of the intensity and character of the disease in febrile attacks, we have seen that the frequency of the pulse is little to be depended on. Dr. Forster (*Jour. f. Kind.*, July and August, 1862, in *New Syd. Soc. Year-Book*, 1862, p. 413), who has made an extensive series of observations upon this subject, asserts that variations in the temperature of the body offer far more certain indications. The instrument used was a Reaumur's thermometer, eight and a half inches long, in which slight variations are easily appreciable. The bulb was placed in the axilla.

The results given are those of observations upon healthy children, during the first few days of life.

A constant lowering of the temperature of the body takes place after birth, which reaches its maximum, 28.97° R., 97.6° Fahr. on an average within the first two hours after birth.

Hours after Birth.	Average Temp. (R.)		Minimum Temp (R.)	
½— 2,	28.97	97.6° Fahr.	28.2	
2— 6,	29.12		28.1	
6—10,	29.49		28.7	
10—15,	29.53		29.0	
15—20,	29.31		28.8	
20—25,	30.04	100.4° F	29.7	
25—30,	29.9		29.7	
30—36,	30.07		29.7	
36—42,	30.04	100.4° F	29.4	
42—48,	29.86		29.35	98.5 F.

A subsequent elevation always occurs. The average time at which the highest temperature was observed, was from thirty to thirty-six hours after birth, at which time the average was 30.07° R.: maximum 30.4° R., minimum 29.7° R.

This elevation was noticed equally when the infant had and had not taken food.

During the first nine days of life, the temperature was observed as follows:

Days.	Maximum (R.)	(F.)	Minimum (R.)	Average (R.)	No. of Observ'ns.
1 —1½, ...	30.4	100.4°	29.7	30.01	22
1½—2, ...	30.5	100.6	29.3	29.93	16
2 —2½, ...	30.4	100.4	29.3	29 87	28
2½—3, ...	30.3	100.2	29.2	29.74	16
3 —3½, ...	30.3		29.3	29.76	27
3½—4, ...	30.2		29.0	29.68	17
4 —4½, ...	30.4		29.2	29.68	25
4½—5, ...	30.3		29.2	29.72	18
5 —5½, ...	30.4		29.2	29.82	23
5½—6, ...	30.5		29.3	29.81	16
6 —6½, ...	30 6		29.4	29.83	23
6½—7, ...	30.3		29.1	29.75	17
7 —7½, ...	30.4		29.3	29.82	22
7½—8, ...	30.4		29.0	29.72	11
8 —8½, ...	30 0		29.4	29.70	8
8½—9, ...	29.9		29.6	29.75	2

We thus see that from the thirtieth to the thirty-sixth hour after birth the highest temperature is observed. Then a fall takes place, which reaches its maximum at four days after birth (average maximum 29.68° R.). Again, between the fifth and eighth days, a new elevation of temperature occurs; but this new elevation is less in degree than that previously noted. The average maximum was 29.83° R. Some differences were found in the results, according as the children were large and heavy, or the reverse. Large and well-developed children had a slightly higher temperature than those less robust.

Thus the average temperature in the early part of the day was, in children weighing eight pounds and upwards, 29.84° R.; but, in children weighing less than this, the average was 29.65° R. The evening observations, again, gave an average for the heavy children of 29.94°; for the others, of 29.77° R. Respecting the temperature at different times of the day, observations showed that, from the second to the ninth day, there was an average elevation of temperature, from morning to evening, amounting to .11° R.: the average morning temperature being 29.75° R.; the average evening temperature, 29.86° R.

This interesting subject has been further examined in regard to older children, by Mr. Finlayson (*Proc. of Manchester Med. Soc.*, in *Brit. Med. Jour.*, Jan. 16, 1869, p. 59).

His results are based on two hundred and eighty-one observations on eighteen different children, of ages varying from twenty months to ten and a half years, and are as follows:

1. The daily range of temperature is greater in the healthy child than that recorded in healthy adults—amounting to 2° F.

2. There is invariably a fall of temperature in the evening, amounting to 1, 2, or 3 degrees.

3. This fall may take place before sleep begins.

4. The greatest fall is usually between 7 and 9 P.M. (at least under the conditions of life in hospital).

5. The minimum temperature is usually observed at or before 2 A.M.

6. Between 2 and 4 A.M. the temperature usually begins to rise, such rise being independent of food being taken.

7. The fluctuations between breakfast and tea-time, are usually trifling in amount.

8. There seems to be no very definite relationship between the frequency of the pulse and respirations, and the amount of temperature; the former being subject to many disturbing influences.

RESPIRATION; ITS RATE AND GENERAL CHARACTERS.—The respiration, like the pulse, to be examined with any advantage to the explorer, must be investigated whilst the child is still and quiet. In the young infant it should be done during sleep, as it is only then that we can find the breathing uninfluenced by disturbing causes other than those connected with deranged health. In the older child, the play of whose functions is more steady and regular, and less readily jarred by trivial causes, this part of the clinical exploration may be made during the waking state; but, still, it must be done whilst the patient is quiet and tranquil, else the results obtained will necessarily be less certain and reliable than under the opposite state of things.

The respiration ought always to be counted by the watch, if possible, especially by the young practitioner. This is the only mode in which a perfectly accurate idea of the frequency of the respiration is to be obtained. It sometimes happens that a greatly increased rate of the breathing will pass unnoticed by the physician, from the fact that it continues to be regular and without effort. We have known children to breathe eighty times in the minute, without presenting any appearance of labor or effort in the act; without cough, and without the least wheezing or sound to be heard at a short distance from the patient. Under these circumstances, the great rapidity of the respiration might very well pass unnoticed, especially by inexperienced practitioners; and, be it remarked, this would be particularly apt to happen were the attention of the physician addressed to some other part of the economy than the thorax, as the seat of the sickness. For instance, in latent pneumonia, when this simulates meningitis, or when it is conjoined with gastro-intestinal symptoms, the failure to note a greatly increased rate of the breathing might very well occur. In many cases of secondary pneumonia, it might also take place. In children, who have been long sick with diseases that debilitate and impoverish the health, a sudden aggravation of the symptoms dependent on collapse of the lung, might be misunderstood and falsely explained, for the want of this precaution. It is therefore a good and useful rule, for the young practitioner always to count the respiration, when he has to do with a case presenting the least obscurity of diagnosis, since this simple habit may guide him to the real seat of disease, which else he might mistake.

The rate of the respiration in children is very different at different ages, a circumstance that should always be recollected in the examination of their diseases. The average frequency of the breathing in newborn children and during the first week of life, is thirty-nine, according to M. Roger. It may rise, however, upon very slight disturbances, to fifty, sixty, or even eighty, while it is not at all unusual to find it at twenty-five or thirty in perfectly healthy infants during sleep. Between the ages of two months and two years the average is about thirty-five. Between two and six years, the average is eighteen during sleep and twenty-three during the waking state; from six to twelve years, the average during sleep is eighteen, and in the waking state twenty-three; from twelve to fifteen years, it is eighteen in the former, and in the latter twenty. It will be observed, therefore, that after the age of two years, the rate of the respiration is nearly the same throughout the remainder of the period of childhood; it changes so little, indeed, that the same average will answer for all practical purposes throughout that period.

The other characters of the respiration require some attention on the part of the practitioner. In the first place, the diaphragm plays a more important part in the process in the child than in the adult. In the young infant, indeed, the function is carried on almost wholly by the action of that muscle, so that the respiration is correctly described by the technical term of abdominal. The walls of the chest are almost motionless. On this account the rate and characters of the breathing can be best studied in young children, by examining the abdomen, the movements of which being strong and marked, are much more easily seized by the eye than are those of the thorax.

During perfect quiescence, and especially during sleep, the breathing of a young child is soft, regular, though less so than in the adult, and perfectly noiseless; it is necessary to place the ear close to the face or chest of the child, and to listen attentively, in order to hear it. In the young child, and especially the young infant, the breathing is, in the waking state, very different from that of the adult. It is short, irregular, uneven, and marked by occasional pauses, followed by a hurry and precipitation of the movements. These peculiarities in the respiration of the infant appear to depend on the weakness and imperfect action of the muscular apparatus at that early age, which causes the various movements of the body to be hesitating and uncertain, and without that steadiness and evenness which are characteristic of matured strength. After the age of two years, these irregular and tumultuous movements cease, and the breathing becomes more regular and even, like that of adults.

In the inflammatory affections of the lungs,—pneumonia, bronchitis, and pleurisy,—the respiration is almost invariably accelerated. In extensive pneumonia, and in capillary bronchitis, it becomes very rapid, rising to eighty or one hundred in the minute. In pleurisy and simple ordinary bronchitis, it seldom becomes so frequent, not exceeding, usually, forty or fifty. In severe pneumonia, the rhythm of the movement sometimes becomes inverted: the pause occurs at the termination of the inspiration instead of the expiration. The patient makes first a violent and labored expiration, bringing into a kind of convulsive action all the expiratory muscles of respiration; instantly after the expiration follows a rapid and full inspiration; then occurs a momentary pause, and again the respiratory act begins with the labored expiratory effort. This kind of respiration is a very unfavorable symptom, as it is indicative of a most dangerous oppression. It is particularly apt to occur in infants, and very young children. It has been called *expiratory* respiration.

The respiration, though almost invariably accelerated in pulmonary inflammations, sometimes retains its normal rate, or even falls below that rate. This occurs, we believe, only under one condition of things: when the forces of the constitution have been sapped by previous disease, or exhaused by the long continuance of the thoracic inflammation. It is therefore met with in cases of secondary inflammations, and in those of the chronic form.

The respiration is very much increased in frequency as a general rule in Atelectasis Pulmonum, or collapse of the lungs. When, therefore, a young child who has been exposed to the causes of this disease (feebleness at birth, exhausting disease, or debilitating hygienic conditions), is suddenly seized with hurried respiration, slight cough, paleness or blueness, with coldness of the cutaneous surface, and in whom there are but few and unimportant physical signs of pulmonary disease, there is very good reason for supposing that some portion or portions of the lungs have become collapsed, or, in other words, have ceased to admit air.

The respiration often lends some assistance in the diagnosis of cerebral affections. In acute meningitis, accompanied by violent febrile reaction, it is more frequent than natural, but often irregular. When the early stage passes into the stage of coma, the breathing becomes slow and irregular. In tubercular meningitis it is seldom increased in frequency except for a day or two before death, whilst in the middle period of the disorder, it is either continued at its normal rate, or becomes slower. During that period, also, it is almost always extremely irregular, and is interrupted by long and mournful sighs, which, to the ear of the experienced physician, who hears in them the almost certain prognostic of approaching death, have an inexpressibly touching sound, increased tenfold by the consciousness of his utter inability to control the fatal tendency of the malady.

There is a peculiarity of the respiration which occurs in collapse of the lung, and also in cases of membranous croup, which ought not to be passed by unnoticed. It is, that, during the inspiratory effort, the ribs move inwards and backwards towards the mesial line of the trunk, instead of outwards as in normal respiration; and at the same time there may be recession of the lower part of the sternum, so that a more or less deep sulcus is produced around the base of the thorax. This peculiarity is readily explained, as shown by Rees and Jenner, by reference to the normal relation which exists between the current of inspired air, the expansion of the lungs, the descent of the diaphragm, and the firmness and resistance of the thoracic walls. If this relation be disturbed in any way, the phenomena we are now considering may be produced. Thus if the diaphragm contract suddenly and violently, the lungs cannot expand with sufficient rapidity, and in order to prevent the occurrence of a vacuum, the thoracic walls must yield to the external atmospheric pressure at their least resisting part, which is, under normal conditions, at the base of the chest. The same result must occur, also, when the diaphragm contracts with only normal force, but when the calibre of the larynx is much narrowed, or again, when a considerable portion of lung-tissue is collapsed. In the article on rickets, an affection in which the firmness of the chest-walls is much diminished, a full account will be found of the masterly manner in which Jenner has applied the above principles to the explanation of the deformities of the thorax so characteristic of that disease.

AUSCULTATION AND PERCUSSION OF THE LUNGS.—This portion of the examination of the sick child ought to be performed, if possible, whilst the patient is still and quiet. Unfortunately, however, it happens in a large majority of cases that the disturbance of position necessary to effect the exploration, and the presence of the physician, together with the irritability of nerves and temper occasioned by sickness, almost always cause more or less resistance on the part of the child, and produce violent screaming and struggling. In young infants we have to contend only against the instinctive resistance to any physical disturbance naturally attendant upon sickness and suffering. In older children, who have learned to distinguish between familiar and strange faces, and in whom the will has begun to act, there is added to the instinctive resistance of the infant an opposition of the most strenuous and annoying kind, founded upon the natural fear of a stranger, and upon a mental determination not to be interfered with or incommoded by the movements and changes of position necessary for a careful examination.

For these reasons, the physical exploration of the chest in young subjects is often to be accomplished only with great difficulty, and in the midst of the most violent screaming, struggling, and contention. It is clearly important to avoid these obstacles if possible. This can only be done by the employment, on the part of the attendants and physician, of the most soothing, gentle, and patient management; and in this way, let it be remarked, it can be done in a large majority of cases. The possession by the physician of a quiet and yet decided manner, the power to interest and attract the child by entering with active sympathy into its little amusements and pursuits, the skill to engage its attention by the exhibition of some book or toy, or the mere influence he may exert to calm its terror or excited irritability, by a soothing voice and gentle persuasion, will, in many instances, overcome any resistance offered to the examination by children over two years of age. Nevertheless, in very young children, and in not a few that are older, no gentle means whatever will overcome opposition. Here the exploration must be made in the midst of struggles and cries, and though the results obtained will be less clear and positive than when the child is reasonable and obedient, a great deal of most valuable information can be acquired by a quick and dexterous practitioner. The percussion can be made in the short intervals between the cries, or even during their continuance, and by placing the ear close to the finger by which it is performed, the sounds elicited can be very well heard and judged. The auscultation is more uncertain; but, by watching intently the long and deep inspirations which immediately precede the violent cries, the presence or absence of râles, and their characters, the degree of freedom with which the air enters the lung, and the existence or non-existence of bronchial respiration, can, after some experience, be ascertained and commented upon, so as to give considerable certainty to the diagnosis.

The particular position in which to place the child, during the examination, is of some importance. After the age of three and four years the position may be the same as that selected for the adult, if only the patient be reasonable and tractable. When, on the contrary, the child resists, it should be taken on the lap of the mother or nurse, or else held in the arms, with the head inclined over one shoulder, while its back is presented to the practitioner. Infants within the year may sometimes be examined whilst engaged in the act of sucking; but this is inconvenient, both from the constrained position, and from the circumstance that the inspirations are short and imperfect during the act. The French authors recommend that the very young infant should be laid, with its face downwards, across the hand of the practitioner, who is then to approach the back of the chest to his ear. We have found either one of the three following positions most convenient, as the case may be: the infant laid across the lap of the mother, with its face downwards, and the head hanging a little over one knee; held in the arms, with the front of its body placed against the mother's chest, and the head lying over her shoulder; or, lastly, a favorite position of ours, placed in a sitting posture upon the lap, supported by one hand in front, and by the other holding the occipital portion of the head.

Auscultation should always be performed before percussion, because the latter generally alarms or annoys the child, and occasions crying, which of course would interfere more or less with the auscultation, were this performed after percussion. The auscultation should be made with the ear rather than the stethoscope, for the reason that the instrument terrifies the child, and also because it cannot, when the child resists and struggles, be kept in contact with the chest. Moreover, the instrument is unnecessary except for the examination of the upper portions of the thorax in front, and it had better, therefore, be dispensed with.

Percussion is best made in children by using a finger of the left hand as the pleximeter, and by striking with one finger of the right. One finger is quite sufficient to elicit all necessary sound in young subjects. The strokes should be light and distinct, consisting of short, quick, and gentle taps.

To perform auscultation and percussion with success, the surface ought to be quite uncovered. The habit of examining the thorax through *one or* several thicknesses of clothing, which some persons fall into, is a most careless one, and cannot but lead to uncertain and erroneous results.

As a general rule, it is sufficient, in young children, to examine the posterior portion of the thorax. Doubtless it is more accurate and artistical to explore the whole chest, and this ought to be done in all obscure cases. But when the child is sick and suffering, when it is irritated and exasperated by the presence of a stranger, or by coercion, and still more, when it is weak and exhausted by long or violent illness, it becomes of the greatest importance to shorten, as much as possible, the time occupied in the examination. For these reasons, it is well to be aware of the fact that, in nearly all inflammatory diseases of the lungs, the morbid changes affect first and most severely the posterior surfaces of those organs. This is thought to depend on the fact that the child passes so large a portion of its time in the recumbent position as to cause the fluids of the body to gravitate towards the dependent parts of the lungs, and thus to determine the beginnings of inflammatory action in that direction. Certain it is, be the explanation what it may, that it is rare to find the anterior surface of the lungs affected either with bronchitis, pneumonia, or pleurisy, the posterior surface remaining healthy. When, therefore, upon auscultation and percussion, no signs of disease are met with over the dorsum of the thorax, we may feel pretty well satisfied that the lungs are healthy. Nevertheless, in all doubtful cases, the examination ought to be extended to the whole chest, in order to make what was, before this has been done, only a strong probability, a certainty. Whenever, also, it is important to ascertain the precise amount of disease in any serious or long-continued sickness, the front as well as the back part of the chest must be examined.

The *respiratory sounds* are not of the same character precisely in the child as in the adult, and of this the physician ought to be aware. In children the vesicular murmur is stronger than in the adult, so that it assumes somewhat of a blowing or bronchial sound. It was in consequence of this peculiarity that Laennec gave it the name of puerile respiration, which, though a mark of health in early life, is, at the period of maturity, an indication of a morbid change in some portion of the pulmonary parenchyma. It ought to be remarked, however, that in infants under two, and particularly in those under one year, the vesicular murmur is, in ordinary respiration, weaker than in adults; owing, no doubt, to the fact that the inspirations are short and imperfect, not distending the lungs to their full capacity. When, however, from any cause, a sigh, a sudden disturbance, or the act of crying, a full and complete inspiration takes place, so as to dilate thoroughly the pulmonary structure, the murmur becomes at once loud and strong, or, in other words, *puerile*, as in older children.

The murmurs of inspiration and expiration bear the same relation to each other as in the adult; the expiration being much shorter and feebler than the inspiration, though, at the same time, it, like the inspiration, is louder than in the adult. In some instances, however, and especially over the posterior, inferior, and lateral regions of the thorax, no sound whatever is heard during the accomplishment of the expiration. This absence of sound during expiration is the more apt to be met with in proportion as the child is younger.

When a young child is made to breathe forcibly and rapidly, the respiratory sounds assume certain characters, even in perfect health, which might mislead an inexperienced observer. The inspiration is short, loud, and hard, so as to assume somewhat of a blowing character, resembling not a little the sound of bronchial respiration. At the same time, the expiration becomes louder also, and longer, which two circumstances, rude or even blowing inspiration, with loud and somewhat prolonged expiration, may very well deceive a young or careless practitioner.

The respiration is most clear and characteristic over the anterior, lateral, and posterior inferior regions of the thorax. Over the origin of the larger bronchia, that is to say, in the interscapular region, the respiration is very strong, so as to resemble very closely bronchial blowing. Here, also, the expiration is often very marked; it is sometimes heard as long, or even longer than the inspiration. Over the scapulas, the sound of respiration is always feebler than elsewhere, except in the præcordial region, from the interposition of the scapulas and of thick muscles between the ear and the lung.

Percussion yields a much louder and more sonorous sound in children over two years of age than in adults,—a circumstance always occurring coincidently with the presence of puerile respiration, and dependent on the fact that the function of respiration is, at that age, very active, and the lungs therefore filled to their utmost capacity with air. In infants under two years of age, the sonorousness varies to a considerable extent in the same child. When the respiration is, as it usually is, gentle and easy, the inspirations being rather feeble and incomplete, the amount of air contained in the lungs will be somewhat deficient in comparison with what their cells might contain, and the sound yielded upon percussion will necessarily be rather dull and insonorous. When, on the contrary, the respiratory process is quick, active, and energetic, from any cause, so as to give rise to the auscultatory phenomenon called puerile respiration, the percussion will be loudly sonorous, as it is in the later periods of childhood, owing to the thorough dilatation of all the air-cells, and the consequent presence in the thoracic cavity of a large amount of air.

The sonorousness of the thorax is different in different parts in children, as in adults. In front, the percussion is most sonorous from just beneath the clavicle on the right side down to one or two inches below the nipple, where it gradually becomes dull, owing to the position of the liver. On the left side the sonorousness is modified by the presence of the heart in the manner already mentioned. Below the præcordial region we again have pulmonary resonance down to the sixth or seventh ribs, below which is heard the tympanitic sound of the stomach.

Behind, the sound is very dull above the spine of the scapula, and considerably so over the scapula beneath its spine. Over the interscapular space it is clear and strong, and more so in the lower than in the upper half. Beneath the inferior angle of the scapula, likewise, it is clear and full, until we approach the inferior margin of the thorax, where it is dulled, even above the lower edge of the lungs, by the presence beneath of the liver on one side and of the spleen on the other. Over the right side the dulness begins a little higher than over the left, in consequence of the greater bulk of the liver than of the spleen.

The lateral regions are very resonant in their upper portions, but become dull as we approach the liver on the right side and the spleen on the left. On the left side the pulmonary sound is often entirely eclipsed by a tympanitic resonance occasioned by the presence of gas in the stomach.

In practising percussion in children it is necessary to strike gently, because, from the great natural sonorousness of the chest in early life, any considerable force would bring out so much sound as to prevent the recognition of a degree of dulness which might readily be perceived by the use of more gentle blows. It is necessary always to compare the two sides together, as in adults, since this often leads to the detection of a degree of impaired resonance which might be otherwise inappreciable. Yet, and the physician ought to be well aware of this, the comparison of the two sides is not quite so useful in young as in mature subjects, because of the fact that the diseases in which the differential comparison is most important, pneumonia and pleurisy, are more frequently double than in adults. It becomes, for the same reason, very important to compare the upper and lower portions of the thorax behind, since we may assure ourselves of the existence of dulness below, of which we were before doubtful, by the fact that the sound is less sonorous in that region than above; which is, as already stated, the very opposite of the healthy condition.

Examination of the Abdomen.—It is often very important to ascertain, by palpation, the form, size, and degree of tension of the abdomen, the presence or absence of effusions within its cavity, and the condition of the organs which it contains; to learn by percussion the degree of resonance which it affords; and, lastly, to find by pressure whether it be unnaturally tender to the touch or not. By a careful inquiry into these various points, and a proper comparison between them and the rational symptoms presented by the patient, we shall be able to discover the existence of tumors, of hypertrophied organs, of unusual developments of gas in the intestines, of dropsical effusions, of enlarged and hardened mesenteric glands, of gurgling, and of soreness on pressure, caused by inflammation of some of the contents of the cavity. The examination should be made, if possible, whilst the child is still and composed. It is best, therefore, to perform it before auscultation and percussion, in children who are old enough or amiable enough to be willingly quiet, since the length of the examination of the thorax often wearies out their patience, and they refuse to submit to further inspection; whilst, in infants and in children who obstinately resist the examination, it matters little at what particular period it is attempted, since it must be done at last in the midst of cries and general agitation. It is, at all times, a difficult and not very useful examination, unless the patient consents to it freely and without fear. It is very necessary, therefore, to resort to every means to obtain this quiet consent. In children over a year old, this condition is to be obtained only during deep sleep, during the act of nursing, or, when the patient is awake, by so pleasing and attracting its attention by toys, by soothing voice and manners, as to cause it to forget what is passing. The reasons why the examination is useless, unless made during a state of calm, are very obvious. In the first place, the contractions of the abdominal muscles give to the walls of the abdomen such a degree of hardness and rigidity, that it is impossible to learn anything in regard to the state of the parts within, except merely what can be learned by percussion; and, in the second place, no acuteness of perception will enable us to distinguish between the cries of anger and fright, and those that may proceed from pain occasioned by pressure.

M. Valleix recommends a plan in the case of young infants, by which tenderness on pressure may very generally be recognized. It is as follows: he carries the child, carefully sustained in the arms, suddenly before a bright light, either that which pours in at a large window during daylight, or that of a bright artificial light at night. The infant, whose greatest pleasure consists in gazing at a bright light, almost always ceases to scream and becomes perfectly quiet while thus attracted. Seizing this opportunity, the physician should pass his hand under the clothes, and applying it directly over the cutaneous surface, he may first learn, by a rapid palpation, the general characters of the abdomen, and then ascertain by sudden and decided pressure whether it be abnormally sensitive. If the pressure gives pain, the infant will cry out at the moment, while, at the same time, a sudden contraction of the countenance will assist to show the perception of some painful sensation. Should the infant, on the contrary, continue to gaze fixedly at the light, without noticing the manœuvres of the physician, it is fair to conclude that there is no inflammatory tenderness present.

Examination of the Mouth and Fauces.—In all obscure attacks of sickness occurring in young children, and even in those who have attained to the faculty of speech, the physician ought to be most careful to inspect the condition of the mouth and fauces, since not a few cases of fever which seem at first view inexplicable, are at once made plain by this simple exploration. We were once called to see a child three years of age, who had been sick three days with fever, thought by intelligent and educated parents to depend on gastric derangement. A single look into the throat showed it to be completely clogged up with pseudo-membranous exudation, whilst a slight hiss in the inspiration, and a husky voice, declared that the same fatal product was just entering the larynx. The time for successful action had slipped by; the patient died two days atter in the agonies of slow croup. On another occasion we were called to take charge of two children in one family who had been ailing several days with feverish symptoms, loss of appetite, languor, and some complaint of sore throat. In both we found the fauces covered with plastic deposit, and both died a few days after of membranous croup. Some years ago we attended a child between five and six years old, for a period of four days, with irregular fever, some vomiting, total anorexia, languor, indisposition to play, and rare complaints of pain in the *chin and neck*, that were not mentioned to us by the attendants, so that all the time we had the idea that the attack was one of gastric embarrassment. Greatly to our amazement and consternation, the mother informed us on the fifth day that she had seen something white in the throat, and upon examination we found both tonsils covered with whitish exudation. Happily the exudation was still confined to these glands, and we were able by appropriate treatment to prevent its further extension.

In croup, also, in whatever form it may make its attack, the fauces ought to be closely watched, in order to know by the presence or absence of false membrane, the probability or improbability of the case being one of the membranous kind. In scarlatina and measles, especially in the former, the throat ought to be examined each day, to ascertain its precise condition, and particularly to learn whether there be present any disposition to membranous, ulcerative, or gangrenous angina.

In young infants, also, the mouth requires a thorough examination from time to time in all their ailments, and especially in their digestive diseases, since they are liable to thrush, to aphthæ, and in chronic and debilitating maladies, to gangræna oris. In teething children the act of dentition requires that the mouth should be inspected occasionally in order to ascertain the state of that process, and to detect the existence of the form of stomatitis called ulcerative, which generally occurs between the ages of one and five or six years.

The mouth can be readily examined by pressing upon the chin with force sufficient to cause the child to separate the jaws. In the young infant this very generally produces crying, during which the mouth is widely opened, and the state of the cheeks, lips, gums, and tongue can be perfectly well seen. In an older child, who refuses to open the mouth, or to keep it open, the handle of a smooth silver spoon is the best instrument to employ by which to effect our purpose.

The throat cannot be well seen at any age, except by depressing the base of the tongue, which is best done by means of a spoon-handle, as above directed. When a child refuses obstinately to open the mouth, and resists with violent struggles, it should be taken on the lap of a strong assistant, with the back of its trunk resting against the chest of the assistant, whose arms should restrain, by being crossed over the body and limbs of the child, its more vehement movements. Another assistant must hold the head of the child steady, whilst the physician obliges it to open the mouth, either by closing the nostrils with the fingers, or by slowly and gently, but firmly, insinuating the handle of the spoon between the teeth. After the spoon has once been passed over the tongue there is seldom any difficulty in obtaining a good view of the fauces.

The *introduction of the finger into the mouth* is of some use as a diagnostic means in the case of infants. It informs us of the temperature of that cavity, of the state of its secretions, and consequently, of its dryness or humidity, and of the disposition and ability of the infant to suck. When an infant is in good health, it will almost always seize the finger, when this is placed in the mouth, and suck vigorously for some instants. It will do the same when it is only ailing with some slight malady, and in the early stage of more dangerous diseases. But, in severe and threatening illness, the infant either refuses to suck upon the finger at all, or does so only for an instant. When the mouth is irritated or inflamed, as in the various forms of stomatitis, the child will open the mouth and cry, and make no attempt whatever at suction. In stupor, and especially in coma, but little attention is paid to the finger, the infant being generally unconscious of its presence.

By watching the child when put to the breast, we may acquire nearly the same information as that just referred to, except that the child would naturally make a greater effort to seize the nipple than the finger, and would therefore nurse, even though the act of so doing were painful, under circumstances in which it might refuse to grasp the finger at all. The refusal to nurse, or the nursing but little at a time, may depend on other causes, however, than sore mouth. It often depends on some anginose inflammation. When this is the case, it may be suspected from the peculiar gulping manner in which the child swallows, and from the fact that swallowing often causes fits of coughing. It is caused also by dyspnœa. An infant laboring under severe oppression from pneumonia, bronchitis, or any other cause, never sucks well and steadily, but rather by fits and starts. The nipple is seized often with avidity, and two or three swallows are made in quick succession; then follows a pause to regain the breath, and then again the effort of deglutition. In a few cases attended with very great dyspnœa that we have seen, the patients have been able to swallow only once or twice without pausing, and even then with very great difficulty.

MANNER OF TAKING DRINKS.—The remarks just made as to the inferences to be drawn from the manner in which the infant sucks, will apply also to the mode in which both infants and older children drink. A young child drinks continuously, without stopping to breathe. If, however, it have any disorder which accelerates the respiration, it will, after drinking a few mouthfuls, cease, jerk its head away from the cup or spoon, breathe irregularly and hurriedly, and cough. These symptoms ought to call attention to the respiratory organs. So, if a child, whose breathing is not oppressed, nevertheless drinks with difficulty, slowly, at intervals, and apparently with pain, there is reason to suspect some impediment in the pharynx, and the fauces ought thereupon to be carefully examined.

We may learn also from the manner of drinking whether the child is thirsty or not. When it drinks often and with avidity, and yet has a dry mouth, it is evident that there is very great thirst.

VOMITING AND THE DISCHARGES BY STOOL.—The physician should never think his examination of a sick child concluded until he has inquired as to the occurrence of vomiting, and as to the state of the discharges by stool. Not only, indeed, should he inquire as to these symptoms, but he ought by all means to inspect personally the appearance of the matters ejected. This is especially important in regard to the dejections, since no description of a mother or nurse, however intelligent, can impart to the physician the precise and accurate idea of the state of those discharges which even a very rapid inspection would give him.

Vomiting is of very frequent occurrence in infancy and childhood. Owing to the fact that the stomach is much less curved in its shape than in the adult, and that the œsophagus enters the organ close to its left extremity, vomiting and regurgitation take place with great readiness, and are, therefore, very common symptoms in the diseases of early life.

The young practitioner must beware lest he regard all kinds of vomiting in the infant as the result of disease. The nursing child is very apt to vomit, even when in the most perfect health, especially if it be suckled at an abundant breast. This kind of vomiting, however, may be readily distinguished from that which depends on some morbid state of the health, by the circumstance of the infant's ejecting nothing but the milk which it has swallowed, either just as it was drawn from the mother, or slightly curdled, and by the fact that it suffers no inconvenience whatever from the act,—neither any violent effort, languor, paleness, nor faintness. And yet we have known a young practitioner to prescribe antacids and absorbents to correct this kind of vomiting, which is most plainly an act of nature kindly intended to rid the infant of any excess of food it may have imbibed.

In older children also, vomiting not unfrequently occurs as a consequence of overdistension of the stomach with food. When, therefore, after vomiting, a child seems relieved and comfortable, when any unpleasant symptoms that may have existed prior to it moderate or disappear afterwards, it is fair to conclude that the act has been beneficial, and wrong to regard it as the signal of a necessity for giving medicine, or for regarding the child as a patient, except insomuch as to watch lest it be sick as an after-consequence of having had the digestive power overtasked.

Frequently repeated vomiting, attended with retching and effort, and with paleness and exhaustion, or with fever, always indicates some considerable derangement of the health. It is impossible to ascertain the precise cause of such vomiting, except by a proper consideration and comparison of all the symptoms the child may present. The cause may be in the stomach itself, consisting of an inflamed state of the organ, or it may be a simple indigestion without any inflammatory condition whatever; it may be that the cause lies in the intestine, being some inflammation, functional disease, or obstruction of that part; it may be pneumonia or pleurisy; it may be the approach of some of the eruptive fevers; or last, and most serious of all, the cause may be some commencing lesion of the brain, which, though as yet determining no proper cerebral symptoms, shall perhaps be destined, by its inevitable progress, to end the patient's life. The detection of the particular causative condition, in any of these forms of vomiting, can be arrived at only by a careful study of the whole constitution of the patient, both through the rational symptoms that may be present, and by a thorough inspection of the different systems of the body by means of the physical methods of diagnosis.

The rule to examine with his own eyes the napkins or cloths of the child, ought never to be forgotten by the practitioner, when there is any reason to suppose that the alimentary functions are at all deranged. The number of the stools in the twenty-four hours ought also to be ascertained, not loosely and carelessly, but precisely and with certainty. Without a close attention to these two precautions, it is impossible for the physician to obtain really useful and exact notions in regard to the nature of the disorder he is called upon to treat, or to judge of the degree of severity of the attack.

We shall not attempt to consider in this place either the various unnatural appearances of the matters vomited, or ejected by stool, the amount of those substances, or the frequency with which the discharges take place, since these various circumstances can be treated of in the manner they require, only when we come to study separately the diseases of which they form a part.

We shall here conclude our remarks upon the methods to be pursued in the clinical exploration of the diseases of children. We have only to add the wish that those who shall honor them with their perusal, may find them of some real assistance in their subsequent studies of the affections of early life. They are intended, of course, chiefly for the student and young practitioner; but we cannot help hoping that they may possibly prove useful to some who have spent a longer time in the profession, but who have never, perchance, given any particular attention to the best modes of investigating the diseases of infants and children.

CLASS I.

DISEASES OF THE RESPIRATORY ORGANS.

CHAPTER I.

DISEASES OF THE UPPER AIR-PASSAGES.

SECTION I.

DISEASES OF THE NASAL PASSAGES.

ARTICLE I.

CORYZA.

DEFINITION; SYNONYMS; FORMS; FREQUENCY.—Coryza is inflammation of the mucous membrane lining the nasal passages. It is called in common language, cold in the head, or snuffles.

We shall describe three forms of the disease,—the simple or mild, the severe, and the chronic. The severe form includes purulent and pseudo-membranous coryza. Simple coryza is very common at all ages; it occurs frequently as a distinct disorder, but still more frequently in connection with laryngitis, bronchitis, pneumonia, measles, scarlet fever, &c. The severe form of coryza is that which was called by Underwood coryza maligna, or morbid snuffles, and which, as he stated, is very different from and far more serious than what is usually called snuffles. Purulent and pseudo-membranous coryza rarely occur as idiopathic affections, but are almost invariably connected with angina or other diseases. We met with one case, however, of the purulent form, unaccompanied by angina or other disease, in 1841, in a child seven weeks old. The case proved fatal. We saw another fatal case of the same form, connected with simple angina, in 1846, in a child five weeks old. Besides these two cases, we have met with four others of the pseudo-membranous variety, accompanied by simple angina, in children between two and six years of age, all of which terminated favorably. The two varieties of the disease occur, however, as already stated, much the most frequently as secondary affections in the course of other diseases, particularly measles, scarlet fever, diphtheria, &c. We shall not attempt in the present article to treat particularly of the cases which accompany the erruptive fevers.

Chronic coryza occurs almost invariably in connection with scrofula or hereditary syphilis.

CAUSES.—The only clearly evident cause of simple primary coryza, in most cases, is chilling of the body. Insufficient dress,—a very common error in this country,—too low a temperature of the nursery, and exposure to bad weather, may often be discovered to have been the causes of the attack.

The causes of the disease, in the two cases of purulent coryza above referred to, were unknown. In one the nurse remarked a slight discharge of blood from the nose soon after birth, and the coryza dated from that time. In the other, the patient, a feeble child, was attacked when two weeks old without any appreciable cause. The four cases of the pseudo-membranous form occurred in 1845 and 1846, during an extensive prevalence in this city of severe scarlet fever, measles, and pseudo-membranous angina and laryngitis, which makes it probable that they depended upon the epidemic constitution of the atmosphere. The cases of MM. Rilliet and Barthez coincided generally with primary or secondary purulent or pseudo-membranous angina. From the account given by Underwood of coryza maligna, there can be little doubt that it was epidemic when observed by himself and Denman. The latter author states that in connection with the coryza there was a general fulness of the throat and neck externally; that the tonsils were tumefied, and of a dark-red color, with ash-colored specks, and in some cases, with extensive ulcerations; and that some of the children swallowed with difficulty: all of which symptoms clearly point to severe concomitant angina. There can therefore be little doubt but that in reality these were cases of nasal diphtheria.

ANATOMICAL LESIONS.—The Schneiderian mucous membrane is found reddened uniformly, or in points, rough, thickened, and sometimes softened. When pseudo-membrane is present, it exists either in fragments, or lines the whole extent of the nasal passages, and is mixed with mucus or muco-purulent fluid, in greater or less quantity.

SYMPTOMS.—The symptoms of simple coryza are sneezing, dryness of the nose at first, soon followed by discharge, which is very small in quantity in the beginning, and more abundant afterwards, and more or less disturbance of the respiration. It is only in young infants that this form of coryza is a disorder of any consequence in itself. In older children it never injures the health by its own action; it is of importance merely as the sign that a cold has been taken, and ought to be regarded as a hint given by nature of the necessity of guarding the child more carefully in future. But, in infants at the breast, and very young children, it assumes much greater importance from the very considerable obstacle it opposes to the act of respiration. At this early age, in fact, coryza becomes a serious and even dangerous disease. If primary, it causes great distress and disturbance to the child, interrupting its sleep, interfering with the act of nursing, and, in some instances, so impeding the function of respiration, as to bring on slight, and more rarely, dangerous asphyctic symptoms. It may, undoubtedly, occasion in weak and debilitated children, more or less extensive collapse of the lungs, an accident which will explain the imperfect performance of the hematosic function in some cases, where the only evident disease is this apparently insignificant one of coryza.

When simple coryza exists in connection with bronchitis and pneumonia, it adds to the severity of those diseases. In children over three or four years old, and particularly in those who are vigorous, it seldom gives any serious trouble. But in young infants, and in weakly children of any age, its influence upon the symptoms is often very marked. The effort to breathe through the nasal passages, when they are partially or wholly occluded by the inflammatory swelling of their lining mucous membrane, or by abundant and viscid secretions, fatigues, and wears away the strength of the child, exhausts its energies, and renders it less able to resist the pressure of the sickness. But not only this;—as in primary coryza, the entrance of air into the lungs is impeded, and the hematosic function is thereby interfered with, while at the same time, the existence of an obstacle to the full inspiratory movement, in addition to that which exists in the lungs themselves from bronchial or pneumonic disease, cannot but assist in the production of that collapse of the pulmonary tissue, which has been found of late years to coincide so often with the bronchitis and pneumonia of young children, and especially with the former.

The reason why coryza causes so much difficulty in young children is, that they persist in the effort to breathe through the nose in spite of the obstruction of the nasal passages. They seem to do this instinctively, not, apparently, having the power to carry on the act of respiration through the mouth, or but for short periods only at a time. The constant struggle to force the air through the nose, and the necessarily smaller quantity that reaches the lungs, are undoubtedly the two chief causes of the symptoms above described as occurring in the coryza of children.

SEVERE CORYZA begins with sneezing and stoppage of the nostrils, soon after which the discharge, which is the pathognomonic symptom of the disease, makes its appearance. This consists of serous or mucous fluid in greater or less abundance, usually of a yellowish color, and which, at first thin and without odor, becomes afterwards thicker and often purulent, with a peculiar, unpleasant, but not fetid odor. In other cases, on the contrary, and especially when the pseudo-membranous exudation is present, the discharge is thin, and often contains small granular particles, which seem to be the detritus of the false membrane, while at other times it is ichorous or even bloody. When false membrane is present, it can often be seen, upon examination of the nostrils in a strong light, to cover the mucous membrane in the form of thin adherent layers of a yellowish-white color. The alæ nasi, and sometimes the whole extremity of the nose, are red and swelled, and the skin, which is tense and shining, presents an erysipelatous appearance. The upper lip is generally reddened, irritated, swelled, and sometimes excoriated, by the nasal secretions.

The *respiration* is generally difficult, nasal, and snoring. When the nasal passages are nearly or quite filled with the secretions, the child being no longer able to breathe through them as in health, is compelled to keep the mouth open. This is exceedingly inconvenient to children of all ages, as it causes great dryness and stiffness of that cavity, and of the tongue and throat, and in very young infants, who instinctively respire almost exclusively through the nostrils, it is attended with such violent efforts as to be a chief or perhaps sole cause of the fatal termination of some cases. In one instance that we saw, the child was seized with attacks of suffocative breathing, which threatened fatal asphyxia, whenever the passages became much impeded. Under these circumstances the cleansing of the passages with a brush would afford complete relief, and, for a time, the little thing would appear to be quite well. Finally, however, death occurred in one of the attacks of dyspnœa, from sudden serous effusion into the lungs. The difficulty of respiration is greater, as we have stated, in proportion as the child is younger, and depends on the physiological fact already referred to, that at a very early age, respiration is performed almost solely through the nostrils, and that the child seems incapable of keeping the mouth open, in order to compensate for their closure. We have never observed *cough* except in cases accompanied by angina. *Epistaxis* occurred in two cases of the pseudo-membranous form, in children between three and five years of age. The bleeding recurred on several occasions, but ceased so soon as the coryza was cured. Infants refuse the breast when the passages are much clogged, or suckle with great difficulty and at long intervals.

The character of the *general symptoms* depends much more upon the accompanying disease, in older children, than on the coryza itself, and it is unnecessary therefore to dwell upon them. In the two infants observed by ourselves, the principal symptoms were, in the case unaccompanied by angina, restlessness, weakness, emaciation, dry, harsh, and wrinkled skin, and violent attacks of dyspnœa; and in the other case, in which angina was present, there were added to these, fever and somnolence. The *duration*, as observed by ourselves, in the two cases occurring in infants, was between two and three weeks; in the one unattended by other disease, and six days in the one accompanied by angina. In the other four cases, which occurred in older children, the duration of the attack depended on the form and degree of the attendant angina. In one case it became chronic, and was accompanied by ulceration of the nasal passages. MM. Rilliet and Barthez state that they saw a child two years old die in three days, and another of three years in the same time; but as one of these cases was complicated with angina and croup, and the other with pseudo-membranous angina, it is clear that the rapid death depended rather on the accompanying disease, than on the coryza itself.

The *prognosis* must depend on the age of the child, and the form of the attack. Simple coryza is never dangerous except in very young infants, and rarely in them. When, however, it occurs in a delicate infant, and is accompanied with either sufficient turgescence of the nasal mucous membrane, or with enough viscid secretion, to cause a nearly complete occlusion of the nasal passages, the effort to breathe through the nose, and the diminished quantity of air that reaches the lungs, will sometimes give rise to great and dangerous exhaustion, or to partial or fatal asphyxia. In older children this form of the disease is never scarcely more than an annoyance.

When simple coryza occurs in connection with other diseases, whether thoracic inflammations, angina, or measles, it always adds, and sometimes most seriously, to the difficulties of the patient, since the effort to breathe through the obstructed air-passages must assist to exhaust the life-forces, while at the same time a certain amount of the blood in the lungs, which ought to be exposed at each inhalation to the inspired air, is deprived of this necessary contact by the fact that less than the natural quantity of air is drawn through the nasal passages at each expansion of the chest.

The purulent and pseudo-membranous forms of coryza are always dangerous, whether they occur alone or as a part of other diseases. The two cases of idiopathic membranous coryza in infants that came under our observation, both proved fatal. The four cases in older children recovered without any difficulty. When they occur in connection with pseudo-membranous angina, or in the course of scarlet fever, the prognosis will of course depend very much on that of those diseases.

Chronic Coryza.—Under this title we shall describe as succinctly as possible a form of inflammation of the Schneiderian membrane, of which we see a good many examples. It is characterized rather by swelling and thickening of the mucous membrane, as far as this can be seen, and by an accumulation of scabs and crusts, causing obstruction to the passage of the air, than by a discharge. The secretions are, in fact, not much increased in quantity beyond their natural amount, but they consist of very thick mucus, or they are purulent in character.

This form of the disease may be met with at any age, from a few weeks old up to puberty. Its principal *cause* has always seemed to be some faulty state of the general health, some constitutional dyscrasia. Like the keratitis and chronic otorrhœa of children, it makes its appearance without any evident exciting cause whatever, or it follows an acute attack of catarrhal inflammation from cold, or an attack of measles, scarlatina, or epidemic angina. On one occasion, we met with it in three out of a family of four children. Though it is unquestionably very apt to occur in scrofulous children, its presence is not necessarily a sign that the patient is of scrofulous habit, since we have seen it in families in which there was no taint of that disease, and have known a good many of those affected by it to recover perfectly, and show no subsequent symptoms of the scrofulous or tuberculous cachexia. Its chief efficient cause appears to be a low state of the general health, the blood being more or less markedly anæmical, and the nutrition of the body imperfect. In addition to the above conditions, it must also be borne in mind, as a fact of the utmost importance, that this form of coryza occurs frequently as a symptom of constitutional syphilis.

The chief *symptoms* of this form of disease are of a local character. The breathing is at all times more or less nasal and embarrassed. Even in the waking state, the child will sometimes attract attention by the noisy and slightly oppressed character of its respiration, while when asleep the obstruction to the passage of air through the nasal passages will be so great as to give rise to symptoms which, though not alarming, are most annoying to those around. The obstruction to the passage of air through the nasal passages produces snoring or hissing sounds, which are sometimes so noisy as seriously to disturb those sleeping in the same apartment. This obstruction also obliges the child to make much greater muscular efforts than in the healthy state, to supply the thorax fully with air, so that the sleep, instead of being quiet and easy as in health, is broken and disturbed by the unusual play of the muscles, and by the disordered internal sensations caused by the reaction upon the nervous centres of a circulating fluid less thoroughly decarbonized than it should be. The child tosses and rolls, sighs and moans, or it cries out in its sleep, or it wakes suddenly and frequently.

When the nasal passages are examined by a full light, they will be seen to be obstructed in two ways: by a thickened and injected state of the mucous membrane, and by the presence in them of scabs, or of more or less inspissated masses of mucus or muco-pus. The mucous membrane is also redder and more highly vascular than natural, and sometimes exhibits an appearance in some points as though excoriated or slightly eroded. There is seldom, indeed rarely, any considerable amount of fluid secretion, as in acute coryza; the secretions are so much more viscid than usual that they desiccate in the passages and form scabs and crusts. Not unfrequently the surfaces become so irritable as to bleed very easily. The act of blowing the nose, a rude touch, or a blow, will cause a considerable discharge of blood, and this is often the symptom for which the practitioner is particularly consulted. The voice of the child is usually characteristic; it is nasal; and when the obstruction is considerable this becomes a marked symptom.

The general appearance of the patient almost always shows a deteriorated state of the general health; his color is too pale; the skin is muddy; the expression is languid; the tissues are more flabby and flaccid than they ought to be; and the movements are less brisk and prompt than in full health. Such patients wake from their sleep less refreshed than is natural; their appetite is often capricious and poor; and the digestive and nutritive functions are impaired. The tongue is often flabby in its texture, pale, and more or less furred, the bowels are irregular, and the discharges often scanty, and of an unhealthy color and smell, or there are alternations of diarrhœa and constipation.

In addition, when the case is connected with constitutional syphilis, some of the other evidences of this disease may usually be detected; though we have, like West, met with cases where the coryza has been the only sign of the constitutional taint.

The *duration* of this form of coryza is very indefinite. Under the most patient treatment, it often lasts for many months, and even when cured is very apt to return with or without apparent exciting causes, so that we have known it to last for several years.

TREATMENT.—Simple coryza requires no treatment in children over two years of age, except attention to hygienic conditions. Young children may often be preserved from attacks of spasmodic laryngitis and bronchitis, by calling the attention of the mother to the strong tendency which exists during infancy and childhood to the extension of disease, and advising, in cases of coryza, that the child should be secluded in the house, or else very warmly clothed if sent out.

In young infants, even the mildest coryza gives trouble, by obstructing the full freedom of the respiratory act, by interfering with the suckling, and by the restless and broken sleep which it induces. In such cases, all the treatment required is to keep the child warm, and to clear the nasal passages, and at the same time lubricate them by the occasional introduction of a camel's-hair pencil, charged with glycerin or sweet oil.

When the coryza is more severe, so as to interfere a good deal with the respiration, it is necessary to make use of the brush frequently, to administer a warm foot-bath once or twice a day, and to give a few drops of syrup of ipecacuanha, with sweet spirits of nitre, every two, three, or four hours. In such cases, the late Dr. Charles D. Meigs was in the habit, for many years past, of directing a flannel cap to be put upon the child, and kept there for two or three days;—a simple, and often most effectual mode of treatment. The cap should be removed after two or three days, so soon as the coryza is relieved, as otherwise the child is apt to become so much accustomed to it as to take fresh cold when it is removed.

In infants laboring under purulent or pseudo-membranous coryza, the indications of treatment are to remove the secretions as they collect, and to subdue the inflammation of the mucous membrane by which they are produced. The first indication may be fulfilled by means of a brush made of long camel's-hair, by throwing water from a small syringe into the nasal passages, or, when the discharges are thin and fluid, by blowing strongly into the nostrils, whilst the tongue is depressed by a finger introduced into the mouth, so as to allow the secretions to pass out of the posterior nares into the fauces.

The second indication is to be fulfilled chiefly by the application of solutions of alum, nitrate of silver, sulphate of zinc or copper, and by insufflations of different substances in powder. The best application is probably the solution of nitrate of silver, which may be made of the strength of five or ten grains to the ounce, or stronger, to be made use of several times a day, with a brush. We have also employed injections consisting of solutions of alum, of from three to six grains to the ounce. It is recommended by MM. Rilliet and Barthez to make insufflations of powdered gum and alum, or of gum and calomel in equal parts, several times a day. There is, however, it seems to us, an objection to this method of treatment, especially in infants,—which is, that the powders would necessarily tend to increase the obstruction which already exists, to breathing through the nose. It has been proposed also to apply a few leeches to the mastoid process, or over the frontal sinuses; but it seems to us that this could scarcely ever be advisable.

In the form of the disease accompanied with angina, an essential part of the treatment must be that of the throat affection. This will be considered in another place.

The treatment of chronic coryza must be twofold: *general* and *local*. The most important points to be attended to in connection with the general treatment are the clothing, the diet, and the administration of tonics and alteratives. The *clothing* ought to be warm during the cold seasons of the year. Flannel, as a general rule, ought to be insisted upon. The arms and neck must be covered, and the legs should never be exposed, after the very mistaken fashion amongst many persons of the present day. The diet ought to be strengthening and nutritious. Fresh meats, milk, bread, and good butter, and the plainer vegetables, ought to be urged upon the child. If necessary, some authority must be made use of by the parents to induce the patient to take a sufficient quantity of these plain, but nutritious articles of food. Pastry, cakes, candies, nuts, hot bread, sweetmeats, and all such rich, but not really substantial diet, should be forbidden to as great an extent as possible.

Of the tonics to be given, the best are the preparations of iron and cod-liver oil. Of the former, we prefer commonly the syrup of the iodide of iron, from three to five drops, at four or five years of age, three times a day, in half a teaspoonful or a teaspoonful of sarsaparilla syrup. Or the Pulv. Ferri of the Pharmacopœia may be given, either in the form of powder, mixed with dry sugar, in pill, or in the shape of the chocolate lozenge. From half a grain to a grain, three times a day, is the proper dose from three or four years to six or seven. The carbonate of iron may be given, if it is preferred, for any cause. Either of these preparations of iron, or any other that may be chosen, should be combined with a grain of quinine, three times a day, whenever the appetite is poor, and when the digestive process seems to be slow and feeble. Or the child may be made to take half a teaspoonful of the fluid extract of cinchona, mixed with an equal quantity of syrup of ginger, half an hour before the meals, while the iron is given alone soon after the meals. When the attack is particularly obstinate, and when, also, it occurs in a subject who either inherits or exhibits signs of the tuberculous or scrofulous diathesis, the best remedy is cod-liver oil, which should be given in doses of from half a teaspoonful to a teaspoonful two hours after each meal. In cases of syphilitic nature, in addition to the above regimen and tonic remedies, we should administer the iodide of potassium, associated in obstinate cases with minute doses of bichloride of mercury.

The *local treatment* must consist in the use of means intended to keep the passages clean and free from scabs and incrustations, and in the employment of astringent and alterative applications. When the patient will submit, the nasal passages should be cleansed by means of a syringe once or twice a day, with tepid water, or milk and water, or with a weak solution of alum in water. The latter may be made in the proportion of from two to four grains to the ounce. If the discharges are offensive, the lotion used for injection should consist of the solution of chlorinated soda, one, two, or three drachms in two ounces of water. After the use of the syringe, and more or less frequently through the day, according to the disposition to dryness of the surfaces, these should be lubricated with some oleaginous application. One of the best is glycerin, or glycerin rubbed up with cold cream (fʒj of the former to ℥j of the latter); or sweet oil, or oil of sweet almonds, may be used. These applications are best made by means of a camel's-hair brush.

Amongst the astringent applications, the best are weak solutions (gr. v to x to water f℥j) of the nitrate of silver, which should be used only once a day, or solutions of the sulphate or acetate of zinc with wine of opium. From two to five grains of either preparation, with a drachm of wine of opium, to an ounce of water, make a proper application. This may be applied twice a day. One of the best means that we know of, however, after the use of the alum or soda injection through the day, is to apply the following ointment at night: ℞. Ungt. Hydrarg. Nitrat., ʒss.; Ext. Belladonnæ, gr. x; Axungiæ, ℥ss.—M. This has succeeded admirably well in several cases in which we have used it. It should be applied, after being completely softened by a gentle heat, on a camel's-hair pencil, care being taken to apply it thoroughly to the surface of the mucous membrane itself, and not merely to the outside of the hardened scabs.

The following case well illustrates the chronic severe form of coryza. It was in all probability of syphilitic nature, though circumstances rendered it impossible to determine this question.

CASE.—The subject of this case, a male, was born after an easy, natural labor, and appeared strong and well, with the exception of a little discharge of blood from the nose soon after birth and slight coryza, the latter of which continued until the child was five weeks old, when it became aggravated, and one of us was requested to visit the infant. It was small and puny; the skin was harsh, dry, and wrinkled, so that the child looked like a little old woman. It was very weak, and had constant secretions from the nostrils of thick, dark-colored pus. When the discharge collected in sufficient quantity to obstruct the passages, the respiration became exceedingly difficult, as the infant seemed incapable of breathing through the mouth. At such moments it seemed as though the child must die of asphyxia. If the nostrils were cleared by any means, by syringing, by the use of a brush, or by blowing into them in the manner already described, the respiration would become easy and natural, until the discharge collected again, when the same scene recurred. During the paroxysms arising from the closure of the nasal passages, the child was entirely unable to take the breast, but after being relieved, had no difficulty whatever; the mouth was either kept shut, or if open, the tongue was observed to be pressed spasmodically against the roof of the mouth, so that it was impossible for more than a very small amount of air to pass over it; the respiration was labored, and accompanied by a loud snoring or nasal sound. There was no other marked symptom, except a nearly constant flatulent distension of the epigastric region. On the day before death, the infant seemed better, appeared to have gained flesh, and looked more intelligent, so that the mother was greatly encouraged; but the next day it was seized during one of the paroxysms of suffocation, which did not seem to be worse than many preceding ones, with copious discharges of bloody and frothy serum from the mouth and nose, and died in about three-quarters of an hour.

At the post-mortem examination we were not allowed to examine the nasal passages or throat. The stomach and bowels were healthy, but much distended with gas. The peritoneum was healthy, but contained a considerable amount of clear yellowish serum. There was serous effusion in both pleural cavities, but no traces of inflammation. The lungs were healthy, with the exception of some ecchymosed points, and general infiltration with sanguineous frothy serum. The trachea and bronchia were natural. The heart was larger than usual, but healthy in other respects.

SECTION II.

DISEASES OF THE LARYNX.

GENERAL REMARKS.

THERE has been much confusion amongst writers on the diseases of children, until within a few years past, in regard to the diseases of the larynx, each one differing from the other in his opinions as to the nature of the several disorders of that organ, and of course as to their classification and symptoms. From later and more rigid observation it has become clear, however, it appears to us, that there are but three diseases of the larynx which deserve to be considered as separate and distinct affections; these are simple erythematous or catarrhal inflammation of the larynx, unattended with spasm of the glottis, or, as that symptom has been emphatically named, laryngismus; simple catarrhal inflammation of the larynx, attended with laryngismus, and called most properly spasmodic simple laryngitis, or more commonly simple, false, spasmodic, or catarrhal croup; and lastly, pseudo-membranous inflammation of the larynx, properly named pseudo-membranous laryngitis, and more commonly called true or membranous croup. There is, moreover, another disease, of which one of the most marked symptoms is spasm of the glottis, or laryngismus, attended with a hoop or stridor, which is now known by the name of laryngismus stridulus, but which is called also Kopp's or thymic asthma, spasm of the glottis, and croup-like convulsion. This disease has often been confounded with the above-named affections of the larynx under the common title of croup, or has been supposed to constitute a distinct disease of the larynx; whereas now it is well known that the laryngismus whence its name was taken, is but one of many symptoms that mark the dependence of the disease upon disordered action of the reflex portion of the general nervous system.

We are well aware, also, that some most competent observers describe a purely spasmodic affection of the larynx, under the title of spasmodic croup, which they believe to be entirely independent of laryngeal inflammation, and to consist in a mere momentary contraction of the sphincter muscle of the larynx, produced by the sympathies which that part holds with other parts of the body, and especially with the digestive apparatus. As we have never, however, in what has now become a very considerable experience in the diseases of children, met with a case of spasmodic croup unconnected with more or less evident catarrhal inflammation of the larynx, we are not disposed to risk increasing the confusion already attending this subject, by making additional and more minute varieties of these affections than those above-named. We are quite willing to acknowledge that, in some cases of simple spasmodic croup, the amount of catarrhal inflammation of the larynx is slight, and that the symptoms of digestive disorder are very strongly marked, but in not a single instance of croup that has come under our notice, have we ever had reason to suppose that the croupal symptoms were dependent solely on simple spasm of the glottis (caused by some distant irritation), unattended with inflammation of the laryngeal mucous membrane. In all such cases that we have met with, it has seemed to us that the condition of gastric, intestinal, or bilious disorders, might be explained in one of two ways. Either the disorder of the digestive function has rendered the child unusually susceptible to cold, by having diminished its power of resistance to the weather; or, the derangement of the bodily functions caused by the cold has weakened, amongst others, the digestive system, and thus brought about various symptoms of gastric or intestinal disturbance, or more commonly of indigestion.

ARTICLE I.

SIMPLE LARYNGITIS WITHOUT SPASM.

Definition; Frequency.—This disease consists of simple erythematous or catarrhal inflammation of the mucous membrane of the larynx, unattended with spasmodic closure of the organ. It is sometimes attended with ulceration, but is unaccompanied by exudation of false membrane. The frequency of the disease, during infancy and childhood, is very considerable; so much so, that not a winter passes without our meeting with a good many well-marked cases.

Predisposing Causes.—The disease occurs at all periods of childhood, but seems to be more frequent under than over five years of age. Of sixty-two well-marked primary cases that we have met with in which the age was noted, fifty occurred in children under, and only twelve in those over that age. Of the former class, twelve were under one year, seventeen between one and two, nine between two and three, five between three and four, and five between four and five. Of sixty-four cases in which the sex was noted, thirty-six occurred in boys, and twenty-eight in girls. As to the influence of the seasons, it may be stated that it is by far the most common in the fall, winter, and spring months.

The only *exciting* causes of the disease which appear to have been ascertained with any certainty, are the action of cold, the positive influence of which cannot be questioned; the inspiration of irritating substances, such as gases, smoke, powders floating in the air, &c.; and violent efforts of crying. MM. Rilliet and Barthez state that they have twice known erythematous and ulcerative laryngitis to follow long-continued and violent crying; and M. Billard also cites this as a cause. We are acquainted with one case in which a slight attack of the disease appeared to have been brought on solely by loud and obstinate screaming.

The disease is very apt to occur in the course of other maladies, and particularly of measles, small-pox, scarlet fever, bronchitis, and pneumonia.

Anatomical Lesions.—The anatomical alterations may consist of simple inflammation of the mucous membrane, with its various effects, or of the same changes in connection with ulceration. The latter class of lesions is almost always confined to secondary cases. In the former class, the mucous membrane varies in color between a deep rose and violet red, which may be either uniform or only in patches. In severer cases, the tissue is at the same time softened or roughened, and sometimes thickened. When redness, softening, and thickening are present, the disease is generally confined to certain parts, and commonly to the epiglottis, and internal portions of the vocal cords; but when redness alone exists, it usually affects the whole of the larynx, and sometimes extends to the trachea. In cases attended with ulcerations, these alterations exist in connection with those already described. The ulcerations are generally small, few in number, very superficial, linear in shape, and are almost always found upon the vocal cords. They are so slight often as to escape observation, unless a very careful examination be made; and this, perhaps, explains the circumstance of so few persons having met with them in the simple acute disease.

Symptoms; Course; Duration.—The attack generally begins with an alteration of the *voice or cry*. In infants the change in the cry alone exists, so that to detect the disease, it is necessary to hear the child cry. In older children the same alteration of the cry is present, but there is in addition a change of the voice, consisting of various degrees of hoarseness. These symptoms may be so slight as to be observed in the cry only when it is strong and forcible, and in the voice so as to strike only the ear of one accustomed to be with the child; or they may be so marked as to be heard in the faintest cry that is uttered, and to be evident in the voice in a moment to the most careless observer; or there may be complete aphonia. They are often intermittent in this form, and are generally most marked in the after part of the day and during the night. Simultaneously with this symptom, or very soon after, *cough* occurs. This is generally hoarse and rough, and early in the attack, dry; at a later period it usually becomes loose, and as this change occurs loses its character of hoarseness. The frequency of the cough is variable, but usually moderate; as a general rule it is most frequent in the evening, and early in the morning, particularly in infants and young children. The disease is almost always preceded and attended with some coryza, which, in the early stage, is marked by sneezing and slight incrustations about the nostrils, and at a later period, by mucous and sero-mucous discharges. The *respiration* remains natural, except that it is sometimes nasal, and sometimes a little accelerated. There is rarely any fever, or it is slight, and occurs only at night. There is no pain in the larynx. In some cases, the hoarseness of the cry, voice, or cough scarcely exists, or is but slightly marked, and the only symptom is a dry, hard, teasing, and paroxysmal cough, which, from its sound, evidently proceeds from the larynx, and resembles very much that produced by the tickling of a foreign body in the throat.

The symptoms of this disease, instead of being of the mild character just described, may be much more severe. The cough is more frequent, hoarse, troublesome, and painful, from the scraping and tearing sensations it occasions in the larynx. The voice is more affected, becoming from husky more and more hoarse, though it is very unusual for it to become weak and whispering, as in membranous and severe spasmodic croup. The respiration is decidedly accelerated, giving rise to slight dyspnœa, and there is more or less fever, which is most marked usually in the after part of the day and in the night. The pulse is more frequent than in health, rising to 120 or 130 in the minute; the skin is hot and dry; the child is thirsty, restless, and uncomfortable. After a few days usually, the cough becomes loose and easy, and ceases to be painful; the voice loses its hoarse tone gradually, the fever disappears, the appetite and gayety return, and the child regains its usual health.

When the laryngeal inflammation becomes violent in this disorder, so as to be attended with considerable swelling of the mucous membrane, the case always, according to our experience, assumes the shape of grave spasmodic laryngitis. To our article upon this latter affection, spasmodic croup, we must refer the reader for further information on this point.

In nearly all the cases of this form of laryngitis that have come under our observation, we have found, upon examining the fauces, more or less decided inflammation of the tonsils, soft palate, and pharynx. In cases following a rather chronic course, from two to four or six weeks, which are rarely accompanied by fever or hoarseness, except at the invasion, and sometimes in the evening, the pharyngeal mucous membrane presented a roughened, thickened appearance, and the tonsils and uvula were more or less enlarged and tumefied.

There is a form of obstinate, troublesome cough, to which children are subject, and of which we have met with a good many examples, that must be noticed here. It depends evidently upon chronic inflammation, with thickening of the mucous membrane lining the upper portion of the larynx. Of this we feel assured, not from any post-mortem examination, since we have never known a child to die of, or while laboring under the affection, but from the tone and character of the cough, from its occasional association with hoarseness of the voice, from its being almost invariably coincident with thickening and granulation of the pharyngeal mucous membrane, and from the fact that the most careful physical examination of the chest fails to reveal any disease whatever of the lungs. The cough is harsh, rough, and, so to speak, tearing in its character. It often sounds, especially towards evening and in the early part of the night, croupal in its tone. It is usually very frequent, not so much, however, during the day, as in the evening and night. It is very generally increased by the horizontal position, so that when the child is put to bed, he will begin to cough violently and almost incessantly, and will continue to do so for one, two, and even three or four hours. The cough is so constant and so severe as to cause the greatest disturbance not only to the patient, who will toss and turn in bed in the most restless manner, but to the mother or attendants, who are excessively annoyed, and sometimes alarmed, by its constancy and obstinacy. Children who become subject to this species of cough, often have repeated attacks during the cold seasons of the year, the slightest exposure sometimes bringing them on. Each attack may last from a few days to several weeks. In one case we knew it to last, without once entirely ceasing, three months, and in another it lasted, with imperfect suspensions of a few days, during the same length of time. Both these cases occurred in hearty boys, one in the second, and the other in the third year of life, and yet both were vigorous and healthy children, as time has shown.

In many other instances, we have known it last two, three, and four weeks, proving all that time most troublesome and rebellious to treatment. During the day, the child generally seems perfectly well, or at most merely a little pale and languid, and he coughs but moderately, but as soon as night comes on, and especially when he is put to bed, the cough begins, and goes on for hours, as stated above, unless some remedy, and particularly some opiate, be given to check it. It is most annoying to the practitioner, for he finds that his usual remedies act merely as palliatives. They check and modify, perhaps overcome it for a time, but the next change in the weather, and especially the least exposure to cold and damp, start it afresh, and he has to resort again to the same round of treatment to subdue it. To the members of the family also it gives great anxiety. At first, they fear it must run into croup, which, however, it very seldom does, and then, finding how difficult it is of cure, and how often it recurs, they can scarcely be persuaded that it does not depend on some serious disease of the lungs.

The principal *cause* of this form of chronic laryngeal irritation is, so far as we have been able to ascertain, an unusual susceptibility of the laryngeal mucous membrane, sometimes the result of a congenital idiosyncrasy, and at other times the result of influences coming into action after birth, and especially of improper dress. We have generally met with it in children dressed upon the hardening system so much in vogue with many of our most highly educated citizens. The low frock, leaving the neck and upper half of the chest exposed to the air, the bare arms and bare legs, persevered in through our cold autumns, winters, and springs, have certainly, in most of our cases, been the cause of this troublesome and chronic cough.

Our experience since the publication of the last edition fully confirms the truth of these remarks upon the style of clothing just referred to. We certainly do not see so many cases of obstinate laryngeal cough as we formerly did, for the simple reason that but few of the families we take care of, adhere to the old-fashioned system of leaving their children half naked.

The *duration* of the disease varies according to its form and the circumstances under which it occurs. When primary, it lasts usually from a few days to one or two weeks, but when it becomes chronic, as we have known to happen in a good many instances, it has lasted from two to four or six weeks, and even two or three months. The duration of secondary cases depends, of course, upon that of the disease during which they occur.

Diagnosis.—The diagnosis of simple laryngitis is very easy. The hoarseness of the cry, voice, and cough, the redness of the mucous membrane of the pharynx, and the absence of general symptoms, will distinguish it from any other affection. In somewhat severer cases of this form, in which the cough is more frequent and harassing, the general symptoms more strongly marked, and the respiration somewhat hurried and oppressed, the attack may at first view present the appearances of bronchitis or pneumonia. The absence of the physical signs of these affections will show at once, by negative evidence, the true nature of the case.

In some cases in which there is little or no hoarseness of the voice or cough, the symptoms strongly resemble the early stage of hooping-cough. We have met with five instances in which it was difficult not to believe, for two and three weeks, that the attack was really one of that disease. In one of these the resemblance was so close, that for several days there was a distinct hoop during the fit of coughing, with vomiting at the close of the paroxysm. The grounds for deciding that the case alluded to was not one of pertussis, were, that the attacks came on like laryngitis, after measles, and that the paroxysms occurred only at night. In the other cases a correct diagnosis was arrived at only by attention to the state of the fauces, which are almost always more or less inflamed and thickened in laryngitis, whilst they are not so in pertussis, and by watching the progress of the sickness.

Prognosis.—The prognosis is always favorable in the mild form of the disease. We have never met with a fatal case.

Treatment.—The treatment of the milder cases of this form of laryngitis ought to be very simple. Children under four or five years old ought to be confined for the first few days to the house, unless the weather be dry and not intensely cold. In mild weather they may be sent out for a short time in the middle of the day. When the patient is five or over, he may continue to go out through the day, unless the weather be very bad. Much must depend upon the peculiarities of the child's own constitution. These can only be learned by observation on the part of the mother. Some children bear going out with such attacks perfectly well; others, if sent out with this simple laryngitis, are almost certain to have spasmodic croup or bronchitis more or less severely. When there is any febrile movement in the case, no matter how slight, the child ought to be kept quiet, and confined to the house. Attention to this point, therefore, careful management of the clothing, slight reduction of the diet if there be any fever, a warm foot-bath at night of simple water, or of water containing a little mustard, the application of some slightly stimulating liniment to the front of the neck and throat twice a day, and the occasional internal administration of some gentle expectorant and anodyne dose, constitute all that is necessary in the great majority of cases of this kind. The best internal remedies are a few drops of syrup of ipecacuanha, with paregoric, laudanum, or solution of morphia given every evening as the child is put to bed, or occasionally through the day also, if the cough is troublesome. A combination of syrup of seneka with that of ipecacuanha, will often be found very serviceable.

The treatment of the chronic laryngeal cough, unattended by fever or any severe constitutional symptoms, described above, requires some special remarks. In the first place, we have to state that we have seldom succeeded in curing it until we had obtained from the parents their consent (often obtained with great difficulty) to a proper dress for the child. Expectorants, nauseants, opiates, antispasmodics, counter-irritants, and local applications, have nearly always failed to procure more than temporary alleviation, until the child has been dressed warmly. We have cured, on several occasions, this kind of cough, after many ineffectual trials with the above remedies, only by insisting upon a mode of dress which covers the neck, arms, and lower extremities. A merino or soft flannel shirt, with long sleeves and high neck, long merino stockings, and thick muslin or canton-flannel drawers, have done more in such cases to effect a cure than all other means. This style of dress has removed the cause, the constant chilling of the body, and then the usual therapeutic measures will, no doubt, assist in overcoming the local changes which constitute the disease.

The best therapeutic measures to be adopted in such cases are the application, once a day, of a solution of nitrate of silver, of from five to twenty grains to the ounce, low down into the pharynx and chink of the glottis, by means of a small sponge-mop on a bent whalebone. After several applications have been made daily, they should be made only once in two or three days. The strength of the solution is to be determined by the condition of the pharyngeal mucous membrane, as we may assume this to mark, in some measure, the state of the contiguous tissue of the glottis. When the mucous membrane of the fauces is covered with large, protuberant follicles, when the tissue between the follicles is thickened, relaxed, spongy-looking, and when the color of the membrane is dark red, the stronger solutions are the best; when, on the contrary, the mucous membrane is not roughened or thickened materially, when the follicles are small, when the color of the tissues is bright red, it is best to use only the five-grain, or even a weaker solution. The most useful internal treatment in our hands has been the exhibition, three times a day, of one of the following mixtures, preferring that with antimony for a vigorous child, and that without antimony for one less robust.

℞.—Potass. Carbonat.,	℈j.
Vin. Antimon.,	fʒss. vel j.
Tinct. Opii,	gtt. xxiv, vel xlviij.
Syrup. Simp.,	f℥j.
Aq. Cinnamom.,	f℥ij.—M.
Ft. Mistura.	

℞.—Potass. Carbonat.,	℈j.
Tinct. Opii,	gtt. xxiv, vel xlviij.
Syrup. Senegæ,	fʒij.
Syrup. Tolutani,	fʒvj.
Aq. Fluvial,	f℥ij.—M.
Ft. Mistura.	

One of the most troublesome cases of cough we ever met with, occurred a few years since in a fine, intelligent, but not robust boy, four years old. He was seized with a hard, obstinate cough, which, in a few days, became really terrible from its almost incessant repetition for many hours at a time. The cough was dry, tickling, choking, repeated with nearly every breath, and so incessant as to drive the parents—and we may add the doctor—almost frantic. The little fellow at last found out, instinctively, that, by placing himself on the front of the body on two pillows, with the chin hanging over the edge of the upper one, he coughed less frequently, and with less violence, than in any other position. Discovering that the uvula was very much lengthened from relaxation and elongation of its mucous membrane, we touched the lower sharp extremity with the lunar caustic stick twice a day. At the same time the following mixture, which we had often used to control general nervous irritability in children, was prescribed; and this, with the lunar caustic application, finally controlled the cough. It was as follows:

℞.—Vin. Antimonii, ...	gtt. xlviij.
Ext. Valerianæ Fl.,	
Tr. Opii Camph., āā	fʒij.
Syrup. Simp , ...	f℥ss.
Aquæ, ...	f℥j.—M.

S. A teaspoonful every hour or two when the fits of coughing set in.

After a few days, when the irritability of the fauces was somewhat subdued, the elongated portion of the mucous membrane of the uvula was cut off close to the muscle, and there was no renewal of the cough afterwards.

When the cough is very harassing at night, from two to four drops of laudanum, with from ten to twenty drops of syrup of ipecacuanha, or two grains of Dover's powder, given once or twice in the evening, have answered better than any other means. When the patient presents an anemical appearance, or other symptoms marking a general deterioration of the health, iron, and especially the syrup of the iodide of iron, given three times a day, has assisted in removing the cough, and especially in lessening the extreme susceptibility of the system to changes of the weather. The diet ought to be light, but strengthening. Good fresh meat, with simple nutritious vegetables for dinner, and bread and milk morning and evening, constitute the most proper diet. In bad weather, during the cold seasons of the year, the child should be confined to the house.

ARTICLE II.

SPASMODIC SIMPLE LARYNGITIS, OR SPASMODIC OR FALSE CROUP.

Definition; Synonyms; Frequency; Forms.—Spasmodic laryngitis is a disease of the larynx almost peculiar to children, consisting of simple catarrhal inflammation, without pseudo-membranous exudation, of the mucous membrane of that organ, attended with spasmodic contraction of the glottis, or laryngismus, occasioning violent attacks of threatened suffocation.

It is the disease commonly called in this country croup, or, by those who make the distinction between it and pseudo-membranous laryngitis or true croup, spasmodic croup. It is known also by the names of false or pseudo-croup. We prefer the term spasmodic laryngitis, because it is expressive of the essential characters of the disease. It is the stridulous laryngitis of MM. Guersent and Valleix; the stridulous angina of M. Bretonneau; the acute asthma of infancy of Millar; and the spasmodic croup of Wichmann, Michaelis, and Double. It is not the laryngismus stridulus described by the English authors, Kerr, Ley, and Marsh, which is the same as the thymic or Kopp's asthma of the Germans, and spasm of the glottis of the French. It is called by Dr. Wood, in his work on the practice of medicine, catarrhal croup.

Spasmodic laryngitis is one of the most *frequent* of the diseases which occur during childhood in this country. It is so common in this city, that almost all mothers who have had any experience in sickness, keep some remedy for it in their houses, which they are in the habit of resorting to upon their own judgment.

During the last 20 years we have had under our charge 109 cases of the disease, of which we have kept an accurate record, and at least 100 other cases, of which we have no written account. Of the 109 cases, 86 were of the mild, and 23 of the severe form.

We shall describe two *forms* or degrees of this disease, the *mild* and the *severe*. Without this distinction it would be impossible to give an accurate account of the disorder, since the two forms differ so much in aspect as to render them almost as much unlike as though they were two distinct affections. Moreover, the mild form differs so widely from membranous or true croup in its course and symptomatology, that the distinction between the two is readily made out, whilst the severe form, on the contrary, resembles true croup so much as to demand often very nice powers of observation to distinguish them, and yet the distinction is one of vast consequence to the patient, since the prognosis and treatment are widely different in the two diseases.

Predisposing Causes.—The disease is much more common at some *ages* than others It occurs most frequently during the period of the first dentition, being more common in the second year of life, which is the time of greatest activity of the first dentition, than at any other age, though it is often met with also in the third and fourth years. In the fifth year it still occurs occasionally, in the sixth and seventh it becomes rare, and after the seventh we have seen it but a few times. Of 106 cases of the disease that we have attended, in which the age was noted, 8 occurred in the first year of life, 33 in the second, 22 in the third, 26 in the fourth, 12 in the fifth, 2 in the sixth, 2 in the seventh, and 1 in the eighth.

It is said to be more frequent in boys than girls, and this seems borne out by our own experience, since of 106 cases, 62 occurred in boys, and 44 in girls.

Spasmodic croup occurs usually as a *sporadic* disease, but is said by some authors to prevail at times as an *epidemic*. We have never had any reason to suppose that it was strictly an epidemic like membranous croup, which appears to a considerable extent in some years, and in others is scarcely seen. We believe rather that the unusual prevalence of spasmodic laryngitis at certain periods, in comparison with others, depends on the fact that certain states of the weather or season predispose or excite to it in a greater degree than usual, and thus occasion a large number of children to be attacked with it.

It is generally believed to be hereditary in certain families, and of this we ourselves have no doubt. We are acquainted with one family in this city, in which the children for three generations were extremely liable to it; with another, in which the grandmother and grandchildren were frequently attacked; and with a third, in which the father and children showed the same predisposition in the most marked manner. The idea is, moreover, entertained by many people in this community.

The natural constitution of the child does not seem to have much influence upon the liability to the disease; it occurs indifferently in the weak and strong. We have no doubt, however, that there are certain transient conditions of the health which do affect the liability to it, since it has long been remarked that disturbances of the digestive functions frequently invite it, and since we have often ourselves found it most apt to attack those who are liable to it, when they happen to be laboring under bilious disorders or indigestions. It is most common during cold weather.

EXCITING CAUSES; COLD.—By far the most frequent exciting cause is the action of cold; either the passage from a warm into a cold atmosphere, or prolonged exposure to cold and damp. It has been known on several occasions to follow long-continued crying, doubtless from inflammatory action set up in the larynx, as a consequence of the excessive determination of blood to that part during the act of crying. We were assured, some time since, by a very intelligent woman, that her little daughter had, at the age of two years, a well-marked attack of croup, after a severe and long-continued fit of crying from some contrariety.

ANATOMICAL LESIONS.—Mild cases of spasmodic laryngitis are so rarely fatal, as to leave us in some doubt as to the character of the anatomical lesions, or whether there are indeed any perceptible alterations of the tissues. We have never ourselves met with a fatal case of this form, and are therefore unable to give any personal account of the condition of the larynx, though we have never doubted, from the nature of the symptoms, the hoarseness, the dry cough, which afterwards becomes loose, and the whole aspect of the disease, that the anatomical condition of the affected organ must be one of slight inflammatory hyperæmia. In some cases, however, that have been examined, a little mucus in the larynx, and slight redness have been found, while in others no change has been detected. Dr. Wood (*Treat. on the Prac. of Med.*, vol. i, p. 779) accounts for this absence of morbid appearances in the following plausible manner: "In some rare instances, no signs of disease are discovered in the mucous membrane, and the patient has probably died of spasm, consequent upon high vascular irritation or congestion, the marks of which disappear with life."

Cases of severe spasmodic croup have not unfrequently proved fatal, and the anatomical alterations of this form of the disease have therefore been well ascertained. These alterations consist of either simple catarrhal inflammation of the laryngeal mucous membrane, or of inflammation attended with ulceration. When the inflammation is simple, the membrane is changed in color, either uniformly or in spots, to a deep rose or dark-red tint. This may be the only alteration, or the tissues may be found also softened, or roughened and thickened. When the redness, thickening, and softening, are all present, these appearances are usually confined to certain parts, and particularly to the epiglottis and vocal cords, but when redness alone is present, it generally affects the whole of the larynx, and may extend to the trachea. To the alterations just described are sometimes added, as was stated above, ulcerations. These are commonly small, few in number, of a linear shape, and are usually seated upon the vocal cords. They are so slight as to escape observation, unless carefully looked for.

SYMPTOMS; DURATION.—The invasion of the *mild form* of spasmodic croup is generally very sudden, for though it is often, probably in a large majority of cases, preceded for a few hours or a day or two by slight coryza, hoarseness, and cough, these symptoms are seldom noticed at the time, and the child is not supposed to be sick until seized with the paroxysm of suffocation, which is pathognomonic of the disease. This occurs in much the larger number of cases during the night, and very generally wakes the child from sleep. Of sixty-four cases observed by ourselves, in which the time of the attack was noted, it occurred in the night in sixty-two, whilst in two it came on in the afternoon. The period of the night at which it takes place is very irregular, but it is much more apt to be before than after midnight, as is shown by the fact that of forty-two cases in which this circumstance was ascertained, the attack was before midnight in thirty, and after in twelve. This agrees very closely with the statement of MM. Rilliet and Barthez, that it has been observed most frequently at eleven in the evening. The duration of the paroxysms varies considerably, and depends a good deal upon the treatment employed. They may last from a few minutes to several hours, but are seldom shorter than from half an hour to an hour. The number of the attacks also varies. In some cases there is but one, though very generally there are several. When the attack occurs early in the night, it is very apt to recur again towards morning, and, unless means of prevention are used, on the following night also, and even, though this happens much more rarely, on the third night. As a general rule, the first attack is the most severe.

When the paroxysm comes on, the child is wakened from sleep by the sudden occurrence of symptoms apparently of the most alarming and dangerous character. These consist of loud, sonorous, and barking cough; of prolonged and labored inspiration, accompanied by a shrill and piercing sound, to which the term stridulous is applied; of rapid and irregular respiration, amounting often to violent dyspnœa, or seemingly impending suffocation: the child, alarmed and terrified at its condition, and at the fright of those around, its countenance expressive of the utmost anxiety, cries violently between the attacks of coughing, and begs to be taken on the lap, or sits up or tosses itself upon the bed, struggling apparently with the disease, which seems for the moment to threaten its very existence. The voice and cry are hoarse, and sometimes almost extinguished during the height of the paroxysms, but become distinctly audible, and often nearly natural, in the intervals between them; differing in this respect from pseudo-membranous croup, in which they remain permanently hoarse or whispering. We have never heard, in this disease, the whispering voice and the short smothered cough of true croup. The face, head, and neck are at first deeply flushed, and as the paroxysm becomes more violent, assume a dark livid tint, which afterwards passes into a deadly paleness, if the attack be long continued. These changes in the coloration depend upon the arrest of the respiratory function and a consequent partial asphyxia. The pulse is frequent during the paroxysm, and the skin sometimes heated. After a longer or shorter period, generally from half an hour to an hour, the respiration becomes more tranquil; the stridulous sound disappears entirely, unless the child be disturbed and made to cry, when it again becomes distinct; the cough is less frequent and less boisterous, and the child generally falls asleep. The attack is very apt to recur towards morning, as has been stated, and if not then, the following night. The patient often seems perfectly well the day after the first paroxysm, with the exception, perhaps, of slight cough. This is no reason, however, for supposing that the disease will not return in the course of the second night, which is almost sure to happen, unless measures be taken to prevent it. The cough generally continues for a day or two, but soon loses the peculiar character expressed by the term croupal; it becomes less frequent and more loose, and the child is commonly well again in two or three days. Sometimes, however, the cough lasts for several days, becoming gradually less frequent, until at last it ceases entirely.

There is very little fever in mild cases, for though the pulse is accelerated and the skin warm during the paroxysm, these symptoms disappear very soon after that is over. In more severe cases, on the contrary, there may be considerable fever, the pulse becoming frequent and full, and the skin hot. The febrile movement is most apt to occur after the first paroxysm, as a consequence, apparently, of the slight catarrh which remains after the attack.

In the few fatal cases on record, the paroxysms have generally become more frequent and more violent by degrees, and death has occurred from suffocation. In other instances, death has been the result of prostration, which itself has probably depended on imperfect hematosis.

Recurrences of the disease are very common, children sometimes having several attacks in a single winter. This is not the case in true croup. We have known but two children to have a second attack of that disease.

The *severe form* of spasmodic laryngitis may begin as such or result from an aggravation of the mild form; or the case may commence as one of simple laryngitis without spasm of the glottis, and as the intensity and extent of the laryngeal inflammation increase, it may assume all the features of the form under consideration. Whatever be the mode of onset of the case, this form of the disease sets in with hoarse, frequent cough, difficult respiration, restlessness, and more or less violent fever, symptoms which almost always become severe for the first time at night, and usually between early evening and midnight; though, in some few cases, they make their first appearance during daylight, and this is very much more apt to happen in this than in the mild form of spasmodic croup. During the night the symptoms increase in severity; the respiration is frequent and difficult, and, after a time, attended with the stridulous sound in inspiration and expiration caused by narrowing of the glottis: the cough is hoarse, dry, and croupal, and unattended with expectoration; the voice becomes hoarse, and fever sets in, the pulse becoming full and frequent, the skin hot and dry, and the face flushed. These symptoms persist, with greater or less severity, throughout the night, while from time to time, they increase to such an extent as to seem to threaten suffocation, resembling then exactly the paroxysms described as occurring in the mild form of the disease. They usually subside, however, very decidedly towards morning, the breathing becoming easier, the stridulous sound less loud, or ceasing altogether, the fever diminishing, and the patient becoming in all respects much more comfortable. This amelioration of the child's condition often continues until the after-part of the day or till evening, when the same train of symptoms reappears. In other cases the disease scarcely subsides at all for two, three, or four days, but continues throughout the day and night to exhibit the same symptoms as have been described above. In cases of this kind, which are not rare, the disease assumes many of the alarming and dangerous characters of pseudo-membranous laryngitis or true croup, and it becomes very difficult often to distinguish between the two. If no favorable change take place, the dyspnœa becomes so violent as to threaten suffocation; the cough is rare and short; the voice is reduced to a mere whisper; the pulse becomes small, extremely rapid and thready; the countenance, at first livid and congested, assumes a pale, cadaveric appearance; the features are contracted; the child becomes comatose or delirious, and death occurs from slow asphyxia, or sometimes in an attack of general convulsions.

In favorable cases, on the contrary, the dyspnœa, and especially the stridulous sound, diminish; the cough becomes loose, less hoarse, and loses its croupal character; expectoration of mucous sputa takes place in older children, whilst in younger, the loose gurgling sound produced by the discharge of the sputa into the fauces, is heard at the termination of each cough; the voice becomes clearer and stronger; the fever diminishes; the child regains its spirits and disposition to be amused; and soon all dangerous symptoms have disappeared, and the recovery is established.

In nearly all the cases that have come under our observation, we have found, upon examining the fauces, more or less decided inflammation of the tonsils, soft palate, and pharynx.

The *duration* of the *severe form* of spasmodic croup depends on the violence of the attack, and on the mode of treatment. When the treatment is begun with from an early period, the disease is much sooner overcome than when allowed to run on for some time without remedies. In cases of moderate severity, the violence of the symptoms usually subsides after thirty-six or forty-eight hours. In more violent cases, on the contrary, the symptoms seldom subside definitively before the third, fourth, and not unfrequently the fifth day. In no case that has come under our observation, has the disease continued to present dangerous symptoms after the fifth day, unless, as not unfrequently happens, the inflammation spreads to the bronchia or tissue of the lungs, producing bronchitis or pneumonia. But even after the signs of severe laryngeal inflammation have disappeared, there almost always remains for several days longer, some cough and huskiness of the voice, marking that the mucous membrane of the larynx has not yet regained completely its healthy condition. The disease is said to have proved fatal in twenty-four hours.

Nature of the Disease.—Authors hold very different opinions as to the nature of spasmodic laryngitis. By Underwood, Dewees, and Eberle, it is confounded with membranous laryngitis, they making no distinction between false or catarrhal, and true or membranous croup. Dr. Cheyne (*Cyclop. Pract. Med.*, Art. Croup) treats of the two affections as one and the same disease, differing only in their degree of violence. Dr. Copland (*Dict. of Pract. Med.*, Art. Croup) describes spasmodic croup as a variety or modification of true or membranous croup. He supposes that the modifications of true croup are attributable to "the particular part of the air-passages chiefly affected, to the temperament and habit of body of the patient, and the intensity of the causes." It seems to us, however, that these views as to the nature of the two diseases are not correct, and we are induced by personal observation to regard them as distinct affections, which may, in the great majority of cases, be distinguished from each other at a very early stage, by a careful observer. The comparative fatality of the two diseases alone is sufficient to establish a wide difference between them. Thus, of 35 cases of the pseudo-membranous form that we have seen, 16 died; while of considerably more than 200 cases of the spasmodic form that we have seen, not one has been fatal. M. Guersent states that of ten cases of the former disease, scarcely two escape; while of upwards of a hundred of the latter that he has seen, not a single one was fatal. (*Dict. de Méd.*, t. ix, p. 365.)

The different effects of treatment in the two affections also point to a wide difference in their nature. True croup is almost inevitably fatal, unless attacked at an early period by energetic remedies, while the mild spasmodic form seldom resists the exhibition of an emetic, a warm bath, or of nauseating doses of ipecacuanha or antimony; and the severe form, though of a most threatening appearance, almost always yields to the proper employment of very moderate local depletion, aided by the use of expectorants, emetics, opiates, and correct hygienic means. When we add to these circumstances, the differences in the anatomical alterations in the two diseases, the difference in the mode of invasion, in the cough, voice, cry, fever, duration of the attack, and state of the constitution, all of which will be carefully described in the remarks on diagnosis, we do not see how we can resist the conclusion that they are two distinct disorders, and not, as was formerly generally asserted by English writers, degrees or modifications of the same.

We believe, therefore, that mild spasmodic laryngitis is a disease consisting in slight catarrhal inflammation of the mucous membrane of the larynx, attended with violent spasmodic contraction of that organ, or, as that condition has been called of late, laryngismus. The spasm of the laryngeal sphincter seems to be the result of a disordered action of the excito-motor innervation of the part, the irritant, which is productive of the morbid innervation, being, in all probability, the inflammation of the laryngeal mucous membrane, which has been already stated to constitute one element of the malady. The nervous element predominates in the early part of the attack, but towards the conclusion, the spasmodic symptoms disappear entirely, and we have left only those which depend on the local tissue-changes.

In severe cases of the disease we have the same element of laryngeal spasm, or laryngismus, coincident with, and produced by, a much more intense and dangerous inflammation of the mucous membrane of the part than exists in the mild form.

Diagnosis.—Unquestionably the disease with which spasmodic laryngitis is most likely to be confounded is pseudo membranous laryngitis, or true croup. There is very little difficulty, however, in distinguishing the mild form of spasmodic croup from true croup, whilst in regard to the severe form, it may be safely stated, that the distinction cannot, in some cases, be made with positive certainty, except by watching the course of the sickness.

Mild cases of spasmodic croup may be distinguished from membranous croup by a comparison of the different symptoms as they arise. The most important of these are: the invasion, in one sudden and almost invariably in the evening or night, in the other slow and creeping, the paroxysm first occurring indifferently day or night; the cough, in one hoarse and boisterous, in the other hoarse and frequent at first, but rare and smothered towards the end; the voice, in one hoarse, but never scarcely whispering, and if so, only during the height of the paroxysm, in the other hoarse at first, and soon permanently whispering or entirely lost; the cry, in one hoarse and stridulous only at the moment of the paroxysm, in the other permanently so; the respiration, in one stridulous and difficult only during the paroxysm, and in the interval perfectly natural, in the other, at first natural, becoming by degrees permanently stridulous, and attended by the most violent dyspnœa, with remarkable prolongation of the expiration and even with recession of the base of the thorax in inspiration; the fever, in one very slight and generally observed only during the nocturnal paroxysm, in the other much more considerable and permanent; and lastly, the duration, in one seldom more than two or three days, in the other rarely less than six, and very often eight or ten days. M. Trousseau states that the *hoarse-sounding croupal* cough is not a sign of the presence of exudation in the larynx, but rather of its absence; but, "when the cough, croupal at first, becomes less and less frequent, and ends with being nearly insonorous with suffocation, there is true croup, that is to say, with plastic exudation in the larynx." This is precisely our own experience. The rare, insonorous cough of M. Trousseau is the condition which we have expressed by the term smothered.

In order to render the diagnosis still clearer, we add the following table, which is altered from one given by MM. Rilliet and Barthez:

MILD SPASMODIC LARYNGITIS.	PSEUDO-MEMBRANOUS LARYNGITIS.
Begins with coryza and hoarse cough, or more frequently with a sudden attack of suffocation in the night. Fauces natural, or merely slight redness, as in simple angina.	In epidemic form, begins as pseudo-membranous angina. In sporadic form, invasion of slight hoarseness for a day or two. There is fever, increase of the hoarseness, with hoarse, croupal cough; in most of the cases, pharyngeal exudation, and a little later, paroxysms of suffocation.
After the paroxysm, the child seems well, the fever disappears, or is very slight. Voice natural, or only slightly hoarse; not whispering.	The fever continues; stridulous respiration; prolonged and difficult expiration; recession of base of thorax during inspiration; cough hoarse and smothered; voice hoarse and whispering.
If the paroxysm returns, it is during the following night, and it is less severe; the hoarseness disappears; the cough becomes loose and catarrhal.	The dyspnœa and suffocation increase; the voice and cough are smothered or extinguished; stridulous respiration persists.
Duration seldom more than three days.	Duration seldom less than five or six days. The hoarseness continues for several weeks.
Very rarely fatal.	Fatal in the majority of the cases.

The only real difficulty in the diagnosis is the distinction between the grave form and pseudo-membranous laryngitis or true croup unconnected with angina; and this, it would appear from all evidence, cannot in some cases be made with absolute certainty. The only certain and indubitable sign by which to distinguish them is the presence of false membranes in the expectoration. The existence of this symptom is proof positive of pseudo-membranous disease, but its absence is no proof that the case must be one of simple inflammation; for, even though the membrane has been exuded in large quantities within the larynx, it is not always thrown off by the effort of coughing or vomiting. To show the difficulty of the diagnosis, we will cite the case quoted by M. Valleix (*loc. cit.*, t. i, p. 211) from M. Hache, of a child supposed to be laboring under true croup, who was sent to the Children's Hospital in Paris, in order to have the operation of tracheotomy performed. The absence of false membrane in the expectoration, and a slight remainder of clearness in the voice, occasioned the suspension of the operation. The child died, and no pseudo-membrane whatever was found in the larynx. The only lesions were moderate redness of the mucous membrane, without tumefaction, and without narrowing of the glottis; so that the fatal termination must be ascribed to spasmodic constriction of the glottis, or to tumefaction of that part which had disappeared after death.

Nevertheless, though the diagnosis is difficult, it can almost always be made out with certainty by attention to the following points. The pseudo-membranous form of the disease is usually preceded or accompanied by the presence of false membranes in the fauces, which is not the case in spasmodic simple laryngitis; the symptoms of invasion of the former disease are less acute than those of the latter, the fever being less violent, and the restlessness and irritability less marked, than is usual in the simple affection, in which the general symptoms are decided from the first. The hoarseness of the voice and cough follow a different course in the two diseases; the progress of these symptoms being slow and gradual in the membranous, and much more rapid in the severe spasmodic form. The fever is marked throughout the attack in the severe spasmodic disease, whilst in the other form it seldom reaches a high degree of intensity. Lastly, the presence of portions of false membrane in the expectoration, in connection with the laryngeal symptoms, affords positive evidence of the existence of true croup.

Of the characters just enumerated as likely to aid us in distinguishing between severe spasmodic and true or membranous croup, we wish to call the reader's attention in greater detail to two—the condition of the voice, and the stridulous respiration. The former is, we have no doubt, much the most important single symptom. In membranous croup, the voice begins by being hoarse, but soon becomes weak, so that after the disease has lasted three or four days, it changes from hoarse to whispering; it becomes, in fact, suppressed. In severe spasmodic croup, the voice is hoarse at first, and becomes more so as the disease goes on, but it very rarely becomes whispering as in true croup, but almost always retains a good volume, so that when urged the child can speak out loudly. Now this is never the case in the membranous disease, for, as the fibrinous exudation is deposited on the vocal cords and in the ventricles of the larynx, it suspends almost entirely the functions of those parts, and the voice is more or less completely suppressed. The remarks just made in regard to the voice will apply also to the *cry*, which should be carefully studied in young infants.

The second very important symptom is the stridor. This is, as might be expected, more marked in all its features in true than in false croup, since in the former it depends on a permanent and considerable obstacle to the passage of the air through the larynx. That tube is, in fact, completely coated over upon its internal surface, with a more or less thick false membrane, which reduces materially its calibre, and impedes to a greater extent the passage of air, than does the mere inflammatory turgescence and swelling of the mucous membrane of the organ in severe spasmodic croup. On this account, therefore, the stridor in the respiration is louder, shriller, more persistent, more marked in the expiration, and attended with greater effort of the respiratory muscles to overcome the obstacle to the passage of the air in membranous than in severe spasmodic croup. We may add that there is something very peculiar in the cough in true croup. When the membrane has come to cover the interior of the larynx, the cough is very distinctive; it has a sound which we can describe only by saying that it always reminds us of the sneezing of a young kitten. This we have never heard in catarrhal croup, no matter how severe.

To conclude, there is in membranous croup a slow, steady, and unrelenting progression of the symptoms, which is not observed in the spasmodic disease. From hour to hour, from day to day, we can perceive, so to speak, from the gradual and steady march of the disease, that a foreign body in the form of a fibrinous moulding is being spread slowly over the cavity of the larynx. In severe spasmodic croup, on the contrary, the course of the symptoms is less regular; paroxysms of suffocation occur as in true croup, but when these are over, the child is often quite comfortable; the symptoms indicating a much less considerable permanent mechanical obstruction than in the other affection.

Spasmodic laryngitis has been mistaken also for laryngismus stridulus. The manner in which it is to be distinguished, will be described in the article on that disease.

PROGNOSIS.—Spasmodic catarrhal laryngitis is very rarely a fatal disease. Of its two forms, there can be no doubt that the severe is much more dangerous than the mild, since in the former the patient labors under acute inflammation of the larynx, as well as under spasm of that organ; whilst, in the latter, the amount of inflammation is so very slight as to be of little or no consequence, were it not associated with the laryngismus, which gives to the disorder its most characteristic features.

Of 109 cases of the disease of which we have kept an accurate record, none proved fatal, though 23 of these were of the grave form. We may state, also, that we have seen at least 100 more cases, of which we have no written account, in none of which was there a fatal termination. We have, therefore, never seen a case of croup without false membrane prove fatal. That it does sometimes end unfavorably, however, cannot for a moment be questioned. There are various examples of the kind scattered through the medical journals. MM. Rilliet and Barthez quote, in proof of this, two cases from the work of Jurine, in one of which an autopsy was made, and no false membrane discovered. Copland (*loc. cit.*) remarks, that in the few cases of the more purely spasmodic forms that he has had an opportunity of examining, an adhesive glairy fluid with patches of vascularity on the epiglottis and larynx, and a similar fluid in the large bronchi, were the only alterations observed.

Great imminence of danger in any case is shown by a high intensity of the stridulous sound, especially as heard in the expiration; by great severity of the dyspnœa or suffocation; by permanently whispering voice; by lividity or extreme paleness of the face; by smallness and rapidity of the pulse; by coldness of the extremities; and by delirium or convulsions.

Treatment.—M. Guersent (*loc. cit.*, pp. 367, 368) states that demulcent and mucilaginous drinks, with stimulating hand-baths and foot-baths, are the principal means that ought to be employed in the treatment of spasmodic laryngitis, or pseudo-croup. He proscribes the use of emetics and leeches as unnecessary in most cases, and is of opinion that they have come into general use, in the management of the disease, in consequence of its having been generally confounded with true croup. In a paper on croup, by the late Dr. Charles D. Meigs (*Med. Exam.*, vol. i, p. 398), may be found the following statement in regard to the spasmodic variety: "The croup sound often ceases entirely, and never returns after the exhibition of a small quantity of ipecacuanha, or any other emetic substance, even when no emesis is produced." He says in another place, that "a foot-bath with mustard, and an emetic of ipecacuanha, is in general all that is necessary for the cure."

In giving our own experience in regard to the treatment of this disease, we shall speak first exclusively of the mild, and then of the severe form, since the measures proper and necessary in the one, are very different from those called for in the other.

Treatment of the Mild Form—*Emetics.*—The great majority of cases will recover perfectly well under the use of emetics employed alone, or in combination with warm baths and revulsives. Of late years we have often succeeded in warding off the slight attack, where there has been good reason to expect it, by the administration of an opiate with syrup of ipecacuanha, at bedtime (early in the evening). At two years of age, three or four drops of laudanum, with ten to twenty drops (according to the gastric susceptibility) of syrup of ipecacuanha; at three or four years, five drops of laudanum with twenty of the ipecacuanha, are about the proper doses. Even when the child has had one attack early in the night, the use of the opiate is most successful, after vomiting, in preventing the usual return towards morning. If the physician is not called until the day after the first attack, this treatment is excellent in the evening of the second day. In cases attended with violent dyspnœa, hoarse cough, and loud stridulous respiration, the emetic should be given until it produces a full effect. In milder cases, in which there is merely loud croupal cough, with an occasional stridulous sound, nauseating doses alone will generally suffice. The most suitable emetic is, as a general rule, ipecacuanha. The best preparation for children is the syrup, of which from twenty to thirty drops may be given to those two years of age, to be repeated every ten or twenty minutes until vomiting is produced, or until the paroxysm is relieved. In very sudden cases, the Syrupus Scillæ Compositus, which is more active in its effects in consequence of the tartar emetic which it contains, might be preferable; about twenty drops of this may be given, and repeated every ten or fifteen minutes, until vomiting or the resolution of the paroxysm is obtained; but, in its employment, care should always be observed not to continue it for too long a time, lest it produce the injurious effects of tartar emetic. Of late years we have almost entirely abandoned the use of this latter emetic, as we succeed perfectly well with the ipecacuanha, and dislike more and more the antimonial preparation in children. When the dyspnœa is very urgent, or when other means fail to produce emesis, we have found nothing so effectual as powdered alum, in doses of a teaspoonful mixed with honey or molasses. (See *Treatment of pseudo-membranous laryngitis.*)

A simple and good method of treating the paroxysm is that recommended by Dr. Charles D. Meigs, in the paper referred to. It is to direct a small teaspoonful of powdered ipecacuanha to be diffused in a wineglassful of water, of which mixture doses of a teaspoonful are to be given every ten, fifteen, or twenty minutes, according to the urgency of the symptoms. This is a plan of treatment often resorted to by parents in this community, where the disease is so common and so well understood, that there are few mothers who have several children, and who have had some little experience, who do not know how to treat a nocturnal attack of mild spasmodic laryngitis.

A very simple and efficient mode of treating the paroxysm, which was first recommended by Graves, consists in gently pressing a sponge soaked in warm water under the chin and to the front of the neck. This may be repeated every ten or fifteen minutes, and under its influence the croupy symptoms will often promptly subside without the use of an emetic.

After the paroxysm is relieved, it is a good plan to direct five or ten drops of the ipecacuanha syrup to be given every two or three hours during the following day; or, if the child seems perfectly well in the morning, we may begin with these doses in the middle of the day, and continue them until bedtime. By this method, the recurrence of the paroxysm during the second night may, we think, often be prevented, and the cough is rendered free and loose much sooner than when the disorder is left to pursue its natural course. Moreover, the child ought to be kept in the house during the next two or three days, or until the cough is thoroughly loose and easy. If the child be at all a delicate one, or one in whom the disorder is prone to be obstinate, there is no plan so good as to make it sit or lie quietly in bed, sufficiently covered, with a large abundance of playthings, or with a kind nurse to read to and amuse it for two or three days.

Baths.—The warm bath is a very prompt and useful remedy in the disease. In all very violent cases, it ought to be resorted to immediately. It should be used also whenever the emetic fails to relieve the urgency of the symptoms, and in cases attendant with much disturbance of the circulation. The temperature of the water ought to be about 95° Fahrenheit, when the child is first immersed, to be raised gradually by the addition of hot water, to 100° or 102°. The child may remain in the bath from ten to twenty minutes.

Revulsives.—The only revulsives that it can be necessary to employ are mustard foot-baths or mustard poultices applied to the interscapular space; and even these are often needless if the emetic be given. Blisters, which are recommended by some of the French writers, can only be proper in rare cases of the grave form.

Purgatives are required when constipation is present, or when there is so much fever on the second or third day, as to show a considerable amount of laryngeal inflammation. Under the latter circumstances some mild remedy of this class may be resorted to with a view to its evacuant effect. We have never had occasion to employ any of the *mercurials*, and believe them to be unnecessary.

Opium is exceedingly beneficial when the emetic, nauseant, or warm bath has failed to relieve entirely, and when a troublesome croupal cough continues after the spasm has been overcome. Laudanum, paregoric, or solution of morphia, in combination with syrup of ipecacuanha or Dover's powder alone, are the most suitable preparations. It is a very good plan to give the child a moderately full dose of the opiate, with ipecacuanha, after the violence of the paroxysm has subsided. It puts the child to sleep, promotes perspiration, softens the cough, and tends to prevent the return of the spasm. Repeated once or twice early in the second night after the first attack, we believe it often assists materially to avert the recurring nocturnal paroxysm.

TREATMENT OF THE SEVERE FORM.—This form of spasmodic laryngitis requires more active measures than the mild form of the disease.

In some of the former editions of this work, *bloodletting* was recommended when the disorder occurred in robust and vigorous children, and a record was given of the employment of venesection in seven out of twenty-three cases, all of which recovered. Since that report we have learned that depletion is less necessary than we formerly supposed, and, as we can still say that we have never yet seen a fatal case of spasmodic croup, either simple or severe, it is fair to conclude that the disease can be safely managed without a resort to this more violent measure. Still, it is but proper to state, that should a case occur to us in a strong and healthy child, in which the breathing should become so much obstructed as to cause deep and alarming venous stasis, and in which these symptoms resisted the more simple means we now employ, we should not hesitate again, as in former years, to employ a venesection to the extent of four ounces at the age of four or five years, or a leeching to the same amount.

Our favorite remedies of late years have been *emetics*, *opiates*, *salines*, and the *sulphurated antimony* of the recent Pharmacopœia. When the patient is a vigorous child, and over a year old, we generally employ the following combination:

℞.—Antimon. Sulphurat.,	gr. j.
Pulv. Doveri,	gr. iij.
Sacch. Alb.,	gr. xij.

M. et div. in chart. xij.

Of these powders one may be given every two, three, or four hours, care being taken to suspend the antimony when it produces any of the peculiar distress or general prostration to be described in the article on pneumonia. In such a case, we use the following combination:

℞.—Potass. Citrat.,	ʒj.
Syrup Ipecacuanhæ,	fʒij.
Tr. Opii Deodorat.,	gtt. xij.
Syrup Simp.,	fʒij.
Aq.,	f℥iss.—M.

Dose for a child two years old, a teaspoonful every two hours.

In older children, both the potash and opiate may be doubled. In all these cases an emetic ought to be given once, or two or three times in twenty-four hours, when the dyspnœa and stridor become very severe; and in about an hour after its operation, the saline dose should be resumed. Of course, if decided drowsiness supervene from the opiate, the doses must be given at longer intervals. The emetic treatment is not so essential as in true croup, where it is so useful in causing the rejection of the false membrane which obstructs the larynx. Yet it is exceedingly useful, and often indispensable, in assisting to expel the viscid mucus secreted within the larynx, and in relaxing, for a time at least, the spasmodic constriction of the glottis, which plays a most important part in the production of the distressing dyspnœa and suffocation of the disease. They act probably also by lessening immediately, or through their action on the circulatory and nervous systems, the inflammation of the larynx. For their choice and mode of administration, the reader is referred to the article on true croup.

Purgatives are required merely to keep the bowels soluble; they should be repeated as may be necessary throughout the disease. If the bowels are moved every day or every other day spontaneously, there is no use in giving them at all. The most suitable are castor oil, rhubarb, or magnesia, in small doses; or an enema may be given from time to time if the child does not resist its application.

Expectorants are useful after the violence of the disease has been moderated by more energetic remedies. They may consist of small doses of ipecacuanha, of antimonial wine and sweet spirits of nitre, of decoction of seneka, snakeroot, or of the citrate or carbonate of potash.

Opiates are necessary, and are serviceable, as has already been stated, in calming excessive restlessness, and in allaying the violence of the suffocative attacks, which depend, in good part, on spasm of the glottis. The most suitable are Dover's powder or some other preparation of opium, or small doses of belladonna, or hyoscyamus.

Belladonna would seem, from its power to relax the sphincters, and from its excellent effects in hooping-cough, to be indicated in this disease, but we have succeeded so well with opium that we have not often used belladonna. Probably a combination of the two would be found beneficial.

A warm *bath* at 97° or 98°, employed once or twice a day, and continued for a period of ten or fifteen minutes, often assists greatly in lessening the sufferings of the child, in calming restlessness, and in moderating the heat of skin, and violence of the circulation, when the latter symptoms are strongly marked. The same effects may often be obtained by the use of *counter-irritants*, as sinapisms, mustard poultices, mustard foot-baths, &c. *Blisters* are of doubtful propriety in any cases.

Hygienic Treatment.—In either form of the disease the child should be placed for the time in a warm room, and warmly clothed. If old enough, it ought to be kept as much as possible in bed during the paroxysm. If so young as to prefer the lap of the nurse, it should be clothed in a long loose wrapper in addition to its usual night-dress. It is very important to confine the child during the whole term of the acute period in the bed, if it is over three or four years old, and in the crib or lap if it be younger. Even after the cessation of the acute condition, it ought to be kept in the house for a few days, in order to make sure of the convalescence. The diet must be simple and of easy digestion, so long as there is any disposition to recurrence of the disease. It may consist of preparations of milk, of bread, rice, or of thin chicken or mutton water. Meat and most vegetables had better be avoided until the convalescence is fairly established.

Prophylactic Treatment.—It is certain that much may be done by a wise attention to physical education, to prevent attacks of the disease in children who show a liability to it. We would strongly recommend, with this view, attention to the following advice given by M. Guersent, who says (*loc. cit.*, p. 381): "It is possible, to a certain extent, to prevent attacks of pseudo-croup, if we fortify the constitutions of children, by exposing them well-clothed to a dry and elastic atmosphere, particularly if they can be kept in constant movement. But of all the precautions which have been found unquestionably advantageous, that which seems most useful is to make them sleep in well-ventilated, dry, carefully closed chambers, having a southern exposure, and always without fire. We have several times been convinced of the utility of this habit in families the children of which were subject to this kind of catarrh."

There can be no doubt that the style of dress used for children in this country, must occasion many and repeated attacks of croup which might just as well have been avoided. The custom is to dress children between the ages of one and four or five years, in such a way as to expose to the air the whole of the neck and the upper half of the thorax (for the dresses are made so low and loose at the shoulders, as to leave the upper part of the chest virtually uncovered). The arms are left bare, as are also the legs from the knee, or above the knee, to the ankle, so that very nearly half of the cutaneous surface is without covering, and this, too, in the very same rooms and temperature in which sit the parents with the body and limbs warmly clothed to resist our climate, at all seasons changeable and uncertain, and, in the winter, very cold. We are perfectly well convinced that this faulty and unreasonable system of dress, which is chosen because it is the fashion, or in order to *harden* the child, who, however, invariably puts on warm clothing when it comes to years of discretion, will explain in part the enormously greater frequency in children than in adults, of the various diseases of the air-passages and lungs produced by cold.

One of the most important means of prevention, therefore, is the adoption of a suitable dress. In winter this should consist of one that shall cover the body completely. If the child be at all delicate, it ought to wear next to the skin a woollen jacket with long sleeves, and covering the chest to the neck. Over this should be put a long-sleeved stout muslin dress, or one of some light woollen material, made in the same style. In young children, the stockings ought to be of wool, and should reach to the knees; in older ones, they may be shorter, but the legs should be covered with drawers made of canton flannel, of thick cotton stuff, or of light woollen flannel. To show the influence of dress, Dr. Eberle mentions the fact that in the country, and especially amongst the Germans, who cover the neck and breast, croup is a very rare disease. During a practice of six years amongst that class of people, he met with only one case of the disease.

When the liability to the disease continues after the completion of the first dentition, we have found the daily use of the cold bath, in connection always with warm clothing, most useful in preventing the attacks. The bath must be commenced with in the summer, and persevered in through the following winter. The water, after the cold weather begins, should be drawn in the evening, allowed to stand all night in a room in which there is a fire through the day, and made use of on the following day. Prepared in this way, we have found the water in the morning at a temperature of between 50° and 60° F. The child ought to be kept in the water only half a minute or a minute, then well rubbed, and dressed immediately.

When the child is pale, weak, and feeble, and unable to bear exposure to the outer air, it may generally be restored to much better health by careful attention to diet, and by the steady and long-continued use of some tonic remedy. The diet ought to consist of bread and milk, and of meat and the simpler vegetables, as potatoes and rice. The tonics most generally suitable are quinine or iron. Of the quinine a grain may be given in pill or solution, twice or three times a day;

while at dinner or lunch, or at both, the child should be made to drink from a dessert to a tablespoonful of port wine, mixed with water. This method ought to be steadily persevered in for from three to six weeks or longer. If quinine be objectionable for any reason, iron must be substituted. The best preparations are the iodide or the metallic iron.

ARTICLE III.

PSEUDO-MEMBRANOUS LARYNGITIS, OR MEMBRANOUS OR TRUE CROUP.

Definition and Synonyms. — Pseudo-membranous laryngitis is an acute inflammation of the mucous membrane of the larynx, attended with the exudation of false membrane.

It is the croup of the French writers, while, in this country, it is called by the various names of slow, creeping, true, membranous or inflammatory. The term given above seems most suitable, as expressive of the real nature and seat of the disease, and we shall, therefore, make use of it in contradistinction to that of spasmodic laryngitis or spasmodic or false croup, which is a much more common and less dangerous affection.

Nature and Relations.—By most authorities, true croup is regarded as an idiopathic primary inflammation, presenting the unusual result of pseudo-membranous exudation, and differing thus from diphtheritic croup, which is a mere complication in the course of a constitutional disease, depending upon the extension of the false membrane from the fauces into the larynx.

The considerations upon which this distinction is based may be briefly stated as follows: that true croup is a disease peculiar to childhood, and that many of its peculiarities are to be explained by reference to the development of the larynx at that period; that it is not connected with any special alteration of the blood crasis; that it nearly always commences in the larynx, and, though it may pass downwards into the trachea, never passes upwards into the pharynx; and finally, that it does not present the complications of diphtheria, such as albuminuria and pseudo-membranous exudation on abraded surfaces, nor its characteristic paralytic sequelæ.

So far as the mere anatomical conditions are concerned, it is generally conceded that there is no essential difference between primary croup and pseudo-membranous croup occurring in the course of diphtheria. The attempt was made by M. Isambert to base a distinction between the two affections upon the ulcerated condition of the mucous membrane of the larynx in diphtheritic croup, but West has met with similar ulceration in cases of primary croup, though somewhat less frequently than in the secondary diphtheritic form.

But further, our personal experience constrains us to state that the differences between the two forms of membranous croup above enumerated, have not seemed to us sufficiently marked and constant to positively establish their essential diversity; and that it is our decided opinion that the vast majority of the cases usually termed pseudomembranous laryngitis are in reality instances of primary laryngeal diphtheria, in which the constitutional symptoms are not grave, and where the faucial deposit has been very slight and perhaps even overlooked.

We are led to this conviction especially by the repeated observation of cases in private practice, where we have been summoned upon the first symptoms of indisposition, and have found a trifling amount of membranous exudation on the fauces, which, in a day or two, had disappeared, while the symptoms of croup supervened.

Apart from their sporadic occurrence, we confess that we are altogether unable to detect any difference between such cases and the cases of so-called primary laryngeal diphtheria, frequently met with in epidemics of diphtheria, where the angina is but trifling, and is rapidly followed by pseudo-membranous formation in the larynx.

It is true that the primary sporadic form of croup we are now discussing occurs more exclusively in children than does the more fully developed form of diphtheria; but it must be remembered that in childhood there seems to be a peculiar tendency for the larynx to become involved in the course of diphtheria, and also that a comparatively trifling amount of membranous exudation in a child's larynx will produce grave symptoms of obstruction.

It is also true that these sporadic cases are rarely attended with albuminuria or followed by paralytic sequelæ; but when we consider the remarkable variations in the frequency of these conditions in different epidemics of diphtheria, it is not inconsistent that they should be usually absent in mild sporadic cases.

It is not our intention in the above remarks to deny the possibility of pseudo-membranous laryngitis occurring as a purely primary idiopathic affection, and we have consequently treated of it as a special disease, apart from the brief notice of it we have given in the article on diphtheria.

But the considerations which we wish to impress deeply upon the mind of the reader are, that in the vast majority of cases of true croup careful examination of the throat at an early period of the attack will show the presence of exudation on the tonsils or pharynx; and that, consequently, whenever a child is taken sick with even the most trifling croupy symptoms, the throat should be immediately and repeatedly examined, and, if any membranous exudation be detected, the case should be regarded as probably one of membranous croup, a most guarded prognosis accordingly given, and the most careful treatment immediately instituted.

FREQUENCY.—The mortality from this disease is in all years considerable, as will be seen from the subjoined table:

Years.	Mortality from Croup.	Mortality from Diphtheria.	Total Mortality less Stillborn.
1838,	101	0	4,118
1839,	83	0	4,765
1840,	79	0	4,593
1841,	100	0	5,456
1842,	137	0	5,558
1843,	129	0	5,155
1844,	179	0	5,187
1845,	176	0	5,882
1846,	111	0	5,944
1847,	121	0	6,881
1848,	177	0	7,268
1849,	130	0	8,989
1850,	151	0	8,034
1851,	180	0	8,374
1852,	208	0	9,745
1853,	303	0	9,184
1854,	304	0	11,280
1855,	265	0	9,906
1856,	268	0	11,720
1857,	256	0	10,331
1858.	292	0	10,162
1859,	312	0	9,084
1860,	354	307	10,849
1861,	304	502	13,838
1862,	258	325	14,386
1863,	443	434	15,045
1864,	455	357	16,794
1865,	350	260	16,453
1866,	239	192	16,005
1867,	185	118	13,153
1868,	206	118	13,949

It is difficult to estimate the number of deaths due to this affection during the last nine years, since diphtheria has made its appearance in the mortality lists of the city, as many cases of diphtheritic croup have unquestionably been returned as mere pseudo-membranous laryngitis.

True croup is, however, rare in comparison with false croup, since while we have seen but 35 cases of pseudo-membranous laryngitis, we have met with upwards of 200 of the catarrhal form. In the following remarks, and in those on the causes of croup, we refer the reader also to the table in the article on diphtheria, showing the comparative monthly and annual mortalities from these two diseases.

From a glance at the accompanying table, it will be seen that since the prevalence of diphtheria, the mortality from croup has not increased disproportionately to the increase in general mortality; and that, during the last three years, in which there was a marked decrease in general mortality, despite the occurrence of over 100 deaths from diphtheria in each year, the mortality from croup has also fallen even below the average sustained for many years previous to the appearance of diphtheria in the mortality lists. No change whatever has occurred in the type of this disease during the past ten years, for the experience of one of us for a number of years before the term diphtheria came into use and appeared in the mortality returns of this city, enables us to attest the fact that pseudo-membranous laryngitis, both of the primary and of the more grave diphtheritic form, occurred then precisely as it does now.

Predisposing Causes—Age.—The disease is far most frequent between the close of the first and fifth years. Thus of 2136 fatal cases reported in this city during the 7 years from 1862–68, 301 were under 1 year of age; 571 between 1 and 2 years; 951 between 2 and 5 years; or, 1522 between 1 and 5 years; and 236 between 5 and 10 years; leaving but 77 cases as occurring after the latter period of life.

Of the 35 cases that we have seen, 28 occurred between 2 and 7 years of age, while of the remaining 7, 1 occurred at the age of 18 months, 1 at that of 19 months, 1 at 7½ years, 2 at 11 years, and 1 each at 11½ and 12½ years.

Sex cannot be said to exercise any decided influence upon the frequency of the disease. Thus of the above 2136 cases, 1115 occurred in males, 1021 in females.

Constitution.—A feeble and delicate constitution is thought by some to be a powerful predisposing cause, but this is at least very doubtful. Of the 35 cases referred to, 26 occurred in healthy vigorous children, while the remaining 9 occurred in children who, though neither very weak nor very sickly, presented a rather delicate appearance.

Season exerts a very powerful influence upon the development of croup. Thus the mortality from it attains its maximum during the months of November, December, and January, during which quarter about four times as many deaths occur from croup as during the months of June, July, and August. It is, however, comparatively frequent from October to March inclusive.

The relation between the mortality from croup and the temperature appears to be a definite and quite constant one, since, as will be seen by referring to the table in the article on diphtheria, with the single exception of February, the mean monthly temperature and the mean monthly mortality from croup rise and fall together throughout the entire year.

The *exciting causes* are but little understood. The only ones which seem to have been ascertained with any certainty, are the application of irritating agents to the laryngeal mucous membrane, and exposure to cold, and even these are questioned by the most accurate observers. In none of the cases that we have seen could the exciting cause be even suspected.

Second Attacks of membranous croup, though rare, are mentioned as occurring by several authors; and, in our remarks on tracheotomy, we quote from Millard an allusion to five cases, in each of which the operation was twice successfully performed for successive attacks of this disease.

We have ourselves met with two instances in which second attacks occurred. One was a girl, who had her first attack at the age of 11½ years, and her second at the age of 12½, and recovered from both without the operation. The second patient was a boy, who had his first attack, a very severe one, but from which he recovered without tracheotomy, at the age of 5½ years; and his second attack, which is fully detailed at the end of the article on tracheotomy (Case 1), at the age of 7½ years.

Anatomical Lesions.—The false membrane may cover the whole mucous membrane of the larynx, and extend into the pharynx, trachea, and bronchia; or it may be confined to the larynx, either forming a complete lining to the cavity of that organ, or consisting merely of patches of various sizes, with intervals of mucous membrane destitute of exudation.

It is, in the first place, important, to ascertain the proportion of cases in which the deposit extends into the bronchia, and those in which it remains limited to the larynx, or larynx and trachea, as the determination of this point has some bearing upon the question of the propriety of the operation of tracheotomy. It appears from a table given by M. Guersent (*Dict. de Médecine*, t. ix, p. 346), containing the results of cases collected by M. Hussenot from various sources, and of autopsies made by M. Bretonneau, numbering in all 171, that in 78 the membrane did not extend beyond the trachea, and that in 42 it invaded the bronchia, and in 30 the condition of the bronchia was not mentioned; and in 21 there were no false membranes; so that of 120 cases, in which the extent of the false membrane was accurately noted, it was confined to the larynx and trachea in 78, and extended into the bronchia only in 42; or in about one-third of the cases. This proportion is the same that Millard gives (*De la Trachéotomie dans le cas de Croup, Thèse de Paris,* 1858), in his masterly memoir upon croup, after an analysis of a large series of cases. Our own experience, based upon 10 cases in which we ascertained with exactitude (by autopsy and by tracheotomy) the extent of the membrane, would indicate that it passed into the bronchia in a larger proportion of cases; since in 5 of these 10 cases the exudation extended beyond the trachea. It is to be borne in mind, however, that the cases upon which these calculations are based have very frequently resulted fatally, and presented extensive formation of pseudo-membrane in the bronchia; and it is probable that it really exists there in other instances, but to a much less extent, so that recovery takes place, and renders it impossible to determine accurately the extent of the exudation.

The proportion of cases in which the pharynx is implicated is also important, since it affects the diagnosis of the disease, and indeed bears upon the question of the identity or non-identity of pseudo-membranous laryngitis and diphtheritic croup.

In considering the statements of authors upon this subject, it is evident that much of the diversity in their opinions depends upon the fact, that they are not in reality all referring exclusively to this particular affection. Thus the assertion of M. Guersent (*Dict. de Méd.*, t. ix, p. 339), that in nineteen-twentieths of the cases the exudation begins in the pharynx, is evidently to be explained on the supposition that this distinguished practitioner had been observing a series of cases of diphtheria in which the exudation had extended into the larynx. MM. Rilliet and Barthez, on the other hand, state that a majority of the cases observed by themselves, and of those of M. Hache also, commenced in the larynx. Dr. West also reports 11 cases of idiopathic croup, in only two of which was there any formation of false membrane upon the velum and tonsils.

In 31 cases observed by ourselves, in which the condition of the throat was recorded, the croup followed membranous angina in 21 cases; in 5 the disease began in the larynx, but was attended later with small deposits upon the tonsils; and in 5 only was there no deposit on the throat at any time.

The fauces and pharynx do not present any constant alterations in cases of croup. Frequently, however, the mucous membrane is red and swollen, and there may be patches of membranous exudation upon the tonsils, velum, half-arches, or on the pharynx. These patches are usually thin, whitish, and may not persist more than 24 to 48 hours, disappearing and being succeeded by similar formations in some other part of the throat.

We believe indeed that such patches of exudation will be found in a large proportion of cases during the first two or three days of the attack; and that they are not more frequently observed, chiefly because the symptoms are usually so slight during this stage, that either no medical attendant is summoned, or his attention is not attracted to the throat.

The most important and characteristic morbid appearances are, however, to be found below the glottis, and consist in the presence of pseudo-membranous exudation, and of certain alterations in the respiratory mucous membrane.

The false membrane may be limited to the larynx, or to the larynx and trachea; or it may extend over these parts and into the branches of the bronchi, even to the third and fourth division. In the larynx, trachea, and even the primitive bronchi, it may appear merely as patches of various sizes, with intervening spaces of vascular mucous membrane; but in the smaller air-passages it usually takes the form of complete tubes lining the bronchus. In some cases, such tubular casts may be formed continuously from the larynx down to the minute bronchioles, completely lining the air-passages. It is undoubted, that in the more sthenic idiopathic form of membranous laryngitis, the membrane is more apt to extend deeply into the ramifications of the bronchi, than when it occurs as a complication of diphtheria.

The false membrane is commonly of a yellowish-white color, and from a fifth of a line to a line in thickness. Its consistence is generally considerable, and it is usually somewhat elastic; indeed the more white and fibrous varieties possess a degree of firmness and toughness that renders it difficult to tear the membrane, or teaze it out with needles. It is an almost invariable rule, that the membrane lining the upper part of the air-passages is more white and firm than that found in the smaller bronchi; so that it frequently happens, that, on drawing out the firm white tubular membrane lining the larynx, trachea, and primary bronchi, it is seen to terminate in branches which grow progressively softer, more yellow and purulent, as they become smaller and smaller.

The free surface of the pseudo-membrane is usually covered with puriform mucus, while the attached surface is adherent with various degrees of force to the mucous membrane beneath. The strength and closeness of these adhesions are often proportionate to the firmness and toughness of the false membrane itself. In the larynx and trachea it is often necessary to employ a good deal of force to separate the exudation from the mucous membrane, and innumerable little fibres are seen passing from one to the other, as though they were processes of exudation dipping into the minute orifices of the mucous follicles. On the other hand, the adhesion between the exudation and mucous membrane is rarely close in the smaller bronchi, or in cases where the pseudo-membrane in the larynx and trachea is less firm and consistent.

These false membranes consist, according to Hasse, mainly of fibrin blended with mucus in various proportions. (*Path. Anat.*, Syden. Soc. ed., p. 278.) On microscopic examination, they present a more or less close fibrous basis, consisting of interwoven fine fibrils, with imbedded cells in varying number; these cells presenting the ordinary appearances of exudation-corpuscles, being round, granular, and containing from one to three small nuclei. The action of various chemical reagents upon them will be found detailed in the article on diphtheria.

The mucous membrane beneath the exudation presents various shades of redness, or it is purplish, or even ecchymosed and blackish. It is also swollen, and may be slightly softened or friable, and has a dull excoriated appearance, though actual ulceration very rarely exists. West mentions the occurrence of small aphthous ulcers about the edges of the rima glottidis and the arytenoid cartilages, as a frequent lesion in idiopathic croup; but the same lesion has been observed in the diphtheritic form of the disease.

There is also vascularity, though usually to a less marked degree, of the bronchial mucous membrane at the points where no exudation exists.

The lungs present some abnormal condition in the great majority of cases. Bronchitis and pneumonia are frequent complications of the disease; and in addition there is often collapse of larger or smaller portions of lung-tissue from occlusion of some bronchus by the pseudo-membrane. In other instances, or frequently in conjunction with collapse of portions of the lungs, the violent respiratory efforts induce either vesicular or even interstitial emphysema, especially of the anterior borders of the lungs.

The morbid appearances found in cases where the croup has followed diphtheritic angina, will be fully described under the head of this latter disease.

In the secondary croup of measles, the appearances are very similar to those observed in primary cases, while in that of scarlet fever the exudation differs in being less consistent and less uniformly spread over the diseased part. In the last-named malady, the membrane is thinner and less adherent, and, in some cases, puriform, soft, and of a grayish color. It is usually poor in fibrin, and prone to decomposition. The mucous membrane is generally discolored and softened.

SYMPTOMS.—In the majority of cases, the development of the symptoms characteristic of croup, is preceded for a few days by the ordinary symptoms of catarrh and slight sore throat. The child is feverish and drowsy; there is cough, which may possess a slight croupy character at some period of the twenty-four hours, but more frequently seems like an ordinary catarrhal cough; coryza is very rarely present, but there is slight soreness behind the angles of the jaws, and the fauces are seen to be reddened, and probably small, thin patches of pseudomembrane may be visible on the tonsils or fauces. This early stage lasts a variable time, usually from one to three or four days, and is more or less gradually succeeded by the symptoms indicative of laryngeal obstruction.

When, on the other hand, the disease begins in the larynx, the invasion is marked by hoarseness of the voice, and hoarse, croupal cough, which often continue for one, two, or three days, until the disease has made considerable progress, before the parents deem it necessary to send for a physician. In a case that came under the observation of one of ourselves, the child was playing about the room at a time when he had hoarse, whispering voice, and cough, and stridulous respiration. In another we were not called until the evening of the third day, though the child had had stridulous cough and respiration for two nights; but, as he always seemed better in the morning, it was not thought necessary to send for a physician until after he had become violently ill. In a third case there was hoarseness of the voice and slight croupal cough during the afternoon of one day and the ensuing night, and the next morning fully developed croup, with fibrinous patches on each tonsil. These symptoms are not generally accompanied by fever at first. The appetite is usually unimpaired, the thirst scarcely augmented, and the child, though somewhat dull and languid, is disposed to be amused at times. In other and severer cases, on the contrary, the disease becomes aggravated much more rapidly, and may soon lead to a fatal termination.

The change of the *voice* is the first symptom observed in the cases which begin in the larynx. It has always been described to us as hoarse, like that which is heard in an ordinary cold. As the disease progresses, the voice becomes more and more hoarse and difficult, until at length it is reduced to a mere whisper. The degree of the hoarseness varies, however, to a very great degree in the same case, the diversities depending probably upon the amount of the spasm of the larynx at the moment, and upon the state of the exudation. We have several times observed the voice to become much stronger and clearer after the operation of an emetic, in consequence, no doubt, of its relaxing effect upon the glottis. The *cough* is peculiar. At first slightly hoarse, it becomes, as the case goes on, very hoarse and hollow, and then short and smothered. It is variable in frequency, and is apt to occur in paroxysms, which are often very troublesome from their frequent recurrence. Towards the termination of the disease in fatal cases, or whenever the case is very severe, it is altogether different in character from what it was at the beginning, becoming short, instantaneous, and smothered, so that it might very well be called whispering. As the disease progresses, it is accompanied by stridulous respiration, in which a hoarse, rough, hissing, or crowing sound is produced by the rush of the air through the constricted larynx. This sound is usually heard at first only during forced inspirations, and is therefore noticed first during the long inspiration which precedes coughing. Next it is heard during the violent respiratory movements which accompany the act of crying; and as the larynx becomes more and more clogged with the exudation, it occurs during both inspiration and expiration, in every act of respiration, and is so loud as to be heard over the whole room, or even in adjoining rooms.

The *respiration* is natural in the early part of the attack, but as the voice and cough assume their characteristic features, and the stridulous sound is established, it becomes more frequent, rising to 28, 32, 40, and 48 in the minute. At first easy and natural, it becomes, during the height of the symptoms, and especially in fatal cases, the most frightful dyspnœa we have seen in any disease. Every movement of inspiration requires the whole force of the inspiratory muscles to lift the walls of the chest, and enable the air to find its way through the narrow and obstructed glottis; each expiration, instead of being short and easy, as in health, and in nearly all other diseased conditions, requires a slow and laborious contraction of the expiratory muscles to expel from the lungs the air which they contain, and which hisses through the larynx with a sound nearly as loud as that produced during inspiration. The dyspnœa just described is for the most part constant, but exhibits paroxysmal aggravations from time to time.

When a paroxysm of dyspnœa occurs, the expression of the child is that of the most terrible anxiety, or of the wildest terror. In some instances, the face becomes deeply red, then blue, livid, and finally pale and white, and for a moment life may seem extinct. In other cases, in which the dyspnœa is constant, the face is of a dusky-red color, the expression anxious and haggard, and the child either lies on its side with the head thrown far backwards in a state of somnolence, or constantly changes its position from restlessness without noticing anything around it.

Jacobi (*Amer. Jour. of Obstet.*, May, 1868, pp. 13–65) lays particular stress upon the fact that in membranous croup the dyspnœa exists both in inspiration and expiration, whereas in spasmodic catarrhal croup it is chiefly present in inspiration, and is due, he thinks, to paralysis of the crico-arytenoid muscles from œdema and infiltration, so that the vocal cords are brought into contact during inspiration.

There is one further peculiarity about the dyspnœa in membranous croup to which we would direct especial notice, since we regard it as of the utmost importance. This consists in the occurrence, in certain cases, of a deep sulcus around the base of the chest, and of recession of the lower part of the sternum and the epigastrium during the act of inspiration.

These phenomena are, perhaps, partly due to the violent action of the diaphragm, but undoubtedly their chief cause is the atmospheric pressure, which acts here, as it has been clearly shown by Jenner to act also in rickets to produce the deformities of the thorax characteristic of that disease. The normal relation which exists between the firmness and resistance of the thoracic walls, the power and rapidity of contraction of the diaphragm, the elasticity of the lungs, and the size of the orifice of the larynx, is here disturbed by the greater or less degree of occlusion of the larynx by membranous exudation. The calibre of the larynx being thus diminished, so that air enters the lungs but slowly, and the diaphragm contracting violently, there will necessarily be recession of the softer parts of the chest-walls at each inspiration.

The persistence of these phenomena during inspiration for even a short time is, we believe, in the highest degree characteristic of the presence of false membranes in the larynx; and when, despite the use of emetics, this form of respiration continues, it constitutes one of the strongest indications for the performance of tracheotomy.

There is no *expectoration* early in the disease, or it consists of yellowish viscous mucus. At a later period there is usually expectoration of false membrane, sometimes in the form of a complete tube, or, much more frequently, of small, irregular fragments, mixed with mucus, or with the matters ejected from the stomach by vomiting. To detect the membrane, the substances expectorated or vomited ought to be placed in water, when the former detaches itself from the mucus and other matters, and is easily recognized. It is not voided in all cases in which it is known to be present in the larynx.

Thus of the 35 cases observed by ourselves, it was expelled by vomiting or coughing in 12; in 21 none was rejected, though its presence in each case was proved by the character of the symptoms and by its existence in the fauces, by autopsy, or by the operation of tracheotomy; in one there was expectoration of masses of viscid, yellowish fibrin, though none of membrane; and in one there was no positive evidence of its existence. M. Valleix (*Guide du Méd. Prat.*, t. i, p. 330) states that of 51 cases, in which the symptoms were very carefully observed, no traces of the exudation could be discovered either in the expectoration or in the matters rejected by vomiting in 26, though its existence was proved by post-mortem examination.

Auscultation.—In the severe cases of true croup that have come under our notice, auscultation has been of little or no aid. In fact, the chest-sounds have been, in most cases, so completely masked by the loud shrillness of the laryngeal stridor, that we have been unable to judge with any satisfaction to ourselves of the condition of the lungs. It has been impossible to determine whether the inability to detect natural respiratory murmur depended on the small volume of air that found its way through the obstructed larynx, or on the fact that all sound was masked by the stridor. This is particularly unfortunate, since, were it not for this circumstance, we might be able to judge by auscultation of the extent to which the bronchia have been invaded by the false membrane,—a matter very important to determine when the question of tracheotomy comes to be mooted in any case.

In cases in which the laryngeal obstruction is not very great, and the stridulous sound consequently less loud, we may auscult the chest to some profit. The vesicular murmur is then either natural, or altered according to the state of the lung.

But, though such has been our own experience in regard to auscultation in croup, MM. Barth and Roger (*Trait. Prat. d'Auscultation*, 2ème ed., p. 255 and 261) describe, as a sign of croup with floating false membrane, a kind of vibrating murmur, or *tremblotement*, as though a movable membranous veil were agitated by the respired air, and which can be heard when the stethoscope is applied over the larynx or trachea. If this sound be heard only in the larynx, and not in the trachea and bronchia, it indicates the plastic exudation to be of small extent, and likely to be rejected by expectoration, and the prognosis is favorable. In the other case, on the contrary, it shows the disease to be of considerable extent, and the prognosis becomes much more serious.

This question will be found referred to more fully in our remarks on the indications for the operation of tracheotomy.

There is a slight *febrile movement* at the onset, or a day or two after the appearance of the earliest symptoms. When the disease is fully established, the fever becomes violent. The pulse rises to 130, 140, 160, or even higher; it is generally regular and strong at first, but as the case progresses, becomes small, feeble, and very rapid. In one of the paroxysms that we witnessed, it became so rapid that it could not be counted, and at last ceased to beat at either wrist for a few instants. The heat and dryness of the skin are very moderate at first, but increase as the disease reaches its maximum, to diminish afterwards gradually, and in fatal cases, to be replaced by coldness, with copious clammy perspirations. The strength is not diminished at first, but as the disease progresses, becomes more or less so in proportion to the violence and duration of the case. The *digestive organs* are but little disturbed by the influence of the disease, with the exception of diminution or loss of appetite, and moderate thirst, during the violent period. Spontaneous vomiting or diarrhœa are rare, though both sometimes occur. The tongue is moist, and generally covered with yellowish-white fur. Pain in front of the larynx has been noticed by several authors. We have ourselves observed it in but one case.

Tumefaction of the submaxillary glands, which is a frequent symptom of pseudo-membranous angina, ought always to be sought for, and when present lends additional support to the diagnosis.

The *mode of recovery* in favorable cases is different in different instances. In some it is sudden, taking place rapidly and steadily after the expectoration of a tubular-shaped membrane. The rejection of the deposit in this form is, however, a rare event, and is not always followed by recovery. We have seen in this city three distinct tubules of false membrane, which were thrown from the larynx of the same child at intervals of two days each. The first was the largest, and came evidently from the whole length of the larynx and trachea; the second was somewhat shorter, and the third not more than half so long as the first. The child was greatly relieved for some hours on each occasion of the rejection of a tubule, but then became more oppressed as the exudation again collected. It sank from exhaustion after the third came away.

As a general rule, the recovery is slow and gradual. After free vomiting, after the expectoration of fragments of false membrane mixed with mucus, or, as happened to ourselves in two cases, after the expectoration of masses of tough yellowish fibrin, or, lastly, after the rejection of mucoid and frothy sputa only, the symptoms gradually ameliorate; the stridulous respiration slowly subsides, and at last disappears; the cough, which was short, hoarse, and smothered, becomes louder, stronger, less hoarse, and what is still more favorable, loose; the aphonia moderates, but very slowly; the fever disappears; appetite and gayety return; and after a variable length of time, the child enters into full convalescence. The hoarseness of voice very generally continues for several days after all the other symptoms have lost their dangerous character, and sometimes lasts for weeks. In one case, the voice was still weak and hoarse on the tenth day, and in another during the seventh week. (*See a paper on Croup, by J. F. Meigs, M.D., Am. Jour. Med. Sci.,* April, 1847.)

Duration.—Death has been known to occur on the first, second, and third days, but such cases are rare. The duration of the disease may be stated at from three to thirteen days, as its most common term. The cases seen by ourselves lasted from five to fourteen days.

Diagnosis.—There can be no difficulty in recognizing the presence of pseudo-membranous laryngitis, when the development of the symptoms of laryngeal obstruction has been preceded for several days by angina, with or without membranous exudation, and hoarseness of voice and cough. For the relation which exists between such cases and diphtheritic croup, the reader is referred to the remarks at the beginning of this article on the nature of croup, and to the remarks made under the head of diagnosis in the article on diphtheria.

When, however, the disease begins in the larynx, and especially when there is no exudation whatever in the fauces, the diagnosis becomes more embarrassing, since under these circumstances there are two other laryngeal affections with which true croup may be confounded, —to wit: false croup or spasmodic catarrhal laryngitis, and laryngismus stridulus. The mode of distinguishing between these different disorders has been carefully described in the remarks on diagnosis, under the head of the former disease. We wish in this place merely to call the attention of the reader, and particularly of the young practitioner, to the extreme importance of the differential diagnosis between the disease now under consideration, and false or spasmodic croup, since the former is one of the most dangerous and frightful disorders to which children are subject, demanding vigorous and active treatment from the start, at which period only is medical treatment likely to be successful; whilst the latter, though of a much more threatening aspect at the beginning, is in fact a mild and safe disease in comparison, and one rarely requiring other than very simple treatment.

In this connection we would urge again the extreme importance of a careful examination of the throat in every case where there are even the most trifling croupy symptoms present, since if membranous exudation be present either on the pharynx or tonsils, there is great danger that the laryngeal symptoms are due to an extension of the false membrane.

PROGNOSIS.—Pseudo-membranous laryngitis is a very fatal disease. In its sporadic form it is decidedly less dangerous than when it occurs in the course of epidemic diphtheria, owing to an extension of the exudation from the fauces into the larynx; but it still ought, at all times and in all shapes, to arouse the utmost caution of the practitioner.

MM. Rilliet and Barthez state that its common termination is in death. M. Valleix says that "to speak in general terms, it is fatal when not treated energetically." M. Guersent (*loc. cit.*, p. 365), after a careful consideration of the statements of various authors, says: "In fact, true croup is one of the most dangerous of all diseases; it is generally fatal." He adds that he has seen at least 100 cases of spasmodic croup, without a single death, while of 10 children attacked with true croup, it is scarcely possible to save two.

We have ourselves seen upwards of 200 cases of spasmodic or false croup, all of which without exception recovered, while of 35 cases of true croup that we have seen 16 died.

The danger is great in proportion as the child is younger and more feeble, and in proportion to the rapidity of the case and the degree of the dyspnœa. The most unfavorable symptoms are: loud stridulous sound heard both in the inspiration and expiration; laborious and prolonged expiration; recession of the base of the thorax during inspiration; whispering voice or complete aphonia; congestion of the face and neck; somnolence; weak, rapid, and irregular pulse; cold extremities; and cold clammy perspirations. The favorable symptoms are: expectoration of false membranes; diminution of the stridulous respiration; the change from whispering to hoarseness or to clearness of the voice; looseness of the cough; moderation of the fever; improvement of the temper and moral state; and amelioration of the general condition.

The case should not, however, be abandoned as hopeless until life is actually extinct. An instance has been elsewhere put on record by one of us (*see paper by Dr. J. F. Meigs, loc. cit.*) of the recovery of a child after momentary suspension of animation from asphyxia on two occasions, though these attacks were followed by a dreadful illness of two days.

TREATMENT.—We are desirous, at the beginning of our remarks upon the treatment of this disease, to express the opinion, that none is *likely* to succeed, unless it be applied early in the case, and by this we mean, in the course of the first, or at the latest, second day. And not only should it be commenced early, but the most active remedies ought to be applied at this period, in their full force. The very moment there is good reason to suppose that a case will prove to be one of membranous croup, the most energetic means ought to be brought to bear upon it, and if this be done from the first, or even second day, we cannot but hope that a considerably larger proportion of recoveries may take place than has heretofore been thought possible.

In the study of the treatment, it will be necessary to rely chiefly upon the works that have been published since the distinction between the two forms of croup has been correctly drawn, for it is impossible to place much dependence on the assertions of previous writers, inasmuch as their opinions in regard to the effects of treatment must have been formed from indiscriminate experience in two very opposite maladies. It is only necessary to recollect the enormous difference in the mortality of the two affections, as shown by our own experience and the statistics quoted from Guersent, to be convinced that the success of any plan of treatment in the one, is no fair argument for its probable success in the other. The most important objects to be held in view in the treatment, are the following: to prevent, if this be at all possible, the formation of false membrane; after its production, to cause its dissolution, or render it less adherent; to provoke its expectoration; to prevent its reproduction after it is once expelled; to subdue the inflammatory diathesis which exists; to allay the painful symptoms; and in every way to support the system.

Bloodletting.—Some authors still award to bloodletting a high place in importance amongst the medical means in our possession, and it was formerly regarded by many in this country as an indispensable agent in the cure. Moreover, there are not a few who believe that, when promptly and boldly resorted to, it will seldom fail in arresting the disease.

The more careful and extended study which this question has received during the past few years, however, has led many observers to doubt the efficacy of venesection in arresting the course of this inflammation, or preventing the formation of membranous exudation.

In those cases where croup supervenes in the course of epidemic diphtheria, there can be no doubt that bloodletting is entirely contra-indicated; and the same remark may be made of those sporadic cases of pseudo-membranous laryngitis, where the onset of the disease is slow, and its course gradual, and unattended by high febrile reaction. Indeed, the more wide experience we have ourselves had in the treatment of this disease during late years, has convinced us that bloodletting is, to say the least, unnecessary, excepting perhaps in cases where the disease occurs suddenly in vigorous children, and is attended at an early period of the attack by violent febrile action and especially marked suffocative symptoms. Under such circumstances, and such only, it may be advisable to resort to a moderate general venesection, principally for the mechanical relief thus afforded to the acute and intense venous stasis caused by the obstructed respiration.

For all the other indications, however, for which bleeding was formerly recommended in croup, namely, for the reduction of the fever and inflammation, and for the arrest of the exudative process, we prefer resorting to the other remedies hereafter mentioned.

Emetics.—Emetics are recommended by all writers, and are generally acknowledged to be amongst the most, if not the most, efficient of all the means employed. M. Valleix (*op. cit.*, t. i, p. 358) has demonstrated their importance more fully than any other writer. He states that of fifty-three cases of the disease, tartar emetic and ipecacuanha were chiefly relied on in thirty-one, of which fifteen were cured; whilst of the twenty-two others, in which they were parsimoniously given, but a single one recovered. He gives other facts in regard to these cases which are highly interesting and important. Thus, of the thirty-one cases treated with powerful emetics, false membrane was rejected during the efforts of vomiting in twenty-six; and of these, fifteen, or nearly three-fifths, recovered. In the five others of the thirty-one, on the contrary, no membrane was expelled, and they all terminated fatally. Again, of the twenty-two cases in which emetics formed but a secondary part of the treatment, two rejected false membrane, and of these one recovered; while of the twenty others in which no false membrane was expelled, not one escaped.

Our own experience in regard to emetics has been as follows: They were administered frequently and in full doses in thirteen of the twenty-one cases which began with angina; in six they were employed to a moderate extent, and in two not at all. Of the thirteen cases in which they were freely administered, eleven recovered; but, as in one of these life was saved only by tracheotomy, the success cannot be attributed to the emetics. Of the eight cases in which the emetic plan was not pushed, all but one ended fatally. False membrane was rejected in eight out of the thirteen cases above referred to. In one of the eight cases the quantity rejected was very small, and this was the case in which the child was ultimately saved only by operation.

Of thirteen cases in which the disease began in the larynx, emetics were energetically used, and frequently employed, in eight. Of the eight, five recovered. In four of the eight cases, fragments of false membrane were rejected, and in a fifth, a mass of viscid, yellowish fibrin (this case was marked as one of unquestionable membranous croup by patches of false membrane on the tonsils). Of these five, four recovered. In three of the eight, no false membrane was rejected, and of these two died. In five of the thirteen cases they were not freely used, being employed in two only as a secondary means; in one other only at the very termination of the attack, as we were not called to the case until the tenth day, the patient having been under homœopathic treatment before; and in the remaining two cases they were not employed at all. Tracheotomy was performed in four of these five cases, but in only one was a successful result obtained.

It is indeed true that there were peculiarities about the age and the type of the disease in the above groups of cases which may modify to some extent the conclusions which seem inevitable; but the statements and facts above given are quite sufficient to show that emetics exert a most powerful and beneficial influence on the disease, and that they ought, therefore, to form a principal and essential part of the treatment.

The emetics generally employed in Europe and this country are tartar emetic and ipecacuanha, which are given in the usual doses to produce full vomiting. We would, however, strongly discountenance the employment of tartar emetic as an emetic, under any circumstances, in children; and, at least in the disease under consideration, we do not like ipecacuanha as an emetic so well as one which, so far as we know, was first recommended by the late Dr. Charles D. Meigs. We refer to the Alumen of the Pharmacopœia.

In an article published by him in the *Medical Examiner* (vol. i, p. 414, 1838), he says he has been "accustomed to make use of an emetic, which, so far as I can learn, is very little employed, but which, from the certainty and the speediness of its operation, ought to be more generally admitted into the list of available medicines for this particular case at least. I have been familiar with its effects for more than twenty years, and my confidence in them increases rather than diminishes by time." He adds, "I think that I have never given more than two doses without causing very full vomiting; but I have often given large quantities of antimonial wine and ipecacuanha, without succeeding in exciting the efforts of the stomach."

The alum is given in powder, in the dose of a teaspoonful, mixed in honey or syrup, or in syrup of ipecacuanha, to be repeated every ten or fifteen minutes until it operates. It is not generally necessary to give a second dose, as one operates in the majority of cases very soon after being taken. We have known it to fail to produce vomiting only in two instances, both of which were fatal cases. In one the disease had gone so far before we were called, that no remedy had any effect upon the stomach. In the other, it was administered several times with full success, but lost its effect at last, as had happened also in regard to antimony and ipecacuanha. The reasons for which we prefer alum to antimony, or ipecacuanha alone, are the following: Antimony, when resorted to as frequently in the disease as we are of opinion that emetics ought to be, is too violent in its action; it prostrates many children to a dangerous degree, and is, we fear, in some cases, itself one cause of death. It acts injuriously upon the gastro-intestinal mucous membrane when used in large quantities and for any considerable length of time. Again, it is very apt to lose its effect, and to fail to produce sickness. Ipecacuanha is a much safer remedy than tartar emetic, but its operation is often too mild, and it not unfrequently fails to produce any effect after it has been used several times. The advantages of the alum are that it is certain and rapid in its action, and that it operates without producing exhaustion or prostration beyond that which always follows the mere act of vomiting. It does not tend like antimony, and in a less degree ipecacuanha, to produce adynamia of the nervous system; an effect which, in some constitutions or states of the constitution, or when it has been exhibited frequently, is often attended with injurious or even dangerous consequences. We have given alum in the dose above mentioned every four or five hours, for two and three days, without observing any bad effects to result from it. The alum was given in all the cases that we have seen, in which emetics were used, and was usually the only one employed when it was found to produce full vomiting. In one of the cases accompanied by violent angina, ipecacuanha was substituted because of its smaller bulk. We have already said that it failed to produce vomiting only in two instances. It was the emetic employed in the nine cases in which fragments of false membrane were rejected, and in that in which the yellow viscid fibrin was expelled. Although it did not occasion the rejection of membrane in the other cases, it operated most speedily and efficiently.

Sulphate of copper has been highly recommended by several writers for its emetic operation, and, by some of the German physicians, as exerting a specific influence upon the disease in addition to its emetic effect. As an emetic, it may be given to a child two or three years old, in the dose of from half a grain to a grain every fifteen minutes, until it operates. To obtain its specific action it is continued afterwards in doses of a quarter of a grain every two hours.

We have also employed, with very good results, sulphate of zinc dissolved in syrup of ipecacuanha, in the proportion of 2 or 4 grains to the fluid ounce. Of this, a teaspoonful may be given to a child two or three years old, and repeated every fifteen minutes until it operates. This combination appears, like that of alum and ipecacuanha, to possess the double advantage of mild action without the production of any subsequent depression.

In the third edition of this work we referred to the use of the yellow sulphate of mercury (Hydrargyri Sulphas Flava) as an emetic in croup, as recommended by Dr. Hubbard, of Maine. Our own experience with this remedy has been limited, and not very decided. In the *American Journal of Obstetrics*, for May, 1870, Dr. Fordyce Barker, of New York, speaks in the highest terms of praise of its emetic effects in this disease. He always commences the treatment by a dose of from three to five grains, according to the age of the child, which may be repeated if it do not act, which he states very rarely occurs, in fifteen minutes. This he follows up with the use of veratrum viride, and states that the treatment has been successful in every case of true croup in which he has employed it. Undoubtedly this high testimony in its behalf justifies a further trial of turpeth mineral in croup, though we confess to a suspicion that not a few of the cases in whose *incipient* stage he has administered this drug so successfully would have proved to be instances of the spasmodic and not of the true membranous form.

We conclude these protracted remarks upon emetics with the statement that from what we have read, and from personal experience, we are induced to regard them as the most important remedies we have to oppose to this fearful malady. The emetic, whatever it may be, ought to be given three or four times in the twenty-four hours, and in severe cases, once in every four or five hours. The exact periods and frequency of the administration must be determined by the stage and urgency of the symptoms, and by the constitution and present strength of the patient.

Mercury.—This powerful drug was first employed freely in the treatment of membranous croup in America, and has subsequently been extensively used by English and European physicians. Calomel is the preparation almost always preferred, and many authors still recommend the administration of this remedy, in larger or smaller doses, in the earliest stage of the attack.

During late years, our increased dislike of the administration of mercury to children in large and frequently repeated doses, and the constant observation that even its free use does not appear to arrest the course of true croup, or prevent the formation of membranous exudation, have led us to abandon entirely its employment in this disease.

At the same time we believe there has been found, in the free administration of the alkalies, an agency far less injurious than mercury, and equally powerful, if not more so, in promoting the separation and discharge of the exudation, and preventing its reproduction.

The internal remedies, then, upon which, after emetics, we rely most surely, are various alkaline salts, the use of which in large doses has been of late years highly recommended, both at home and abroad. Those which we are most in the habit of employing are the chlorate and citrate of potash, which should be given in full and frequently repeated doses, as, for example, two or three grains every two hours to a child of four years old. We are also in the habit of combining with the chlorate of potash, tincture of the chloride of iron, in doses of three to five drops, at the same age.

Antispasmodics are undoubtedly useful in some cases, when there is much laryngeal spasm.

Opium is, however, the best remedy that can be employed for this condition, since it constitutes an important element in the treatment, by alleviating pain and restlessness, at the same time that it relieves the laryngismus, and thus diminishes the asphyctic symptoms. We would consequently recommend the use of some of the preparations of opium, as the tinct. opii deodorata, in such doses and at such intervals as will maintain a gentle opiate impression. In this, as in many other diseases of children, it is better not to prescribe the opium in combination with the other remedies that may be administered, but to either give it separately, or, better still, to add it to the dose of the other medicines at the time of administration, so that the amount of the dose of opium and the frequency of its repetition may be modified constantly in accordance with the condition of the child.

Revulsives often prove useful in allaying restlessness, and moderating the violence of the suffocative attacks. Sinapisms and mustard poultices, applied upon various parts of the cutaneous surface, and mustard foot-baths, are amongst the best. The warm bath is often highly beneficial in the same way.

We do not think it desirable ever to employ blisters in this disease.

LOCAL TREATMENT.—In those cases, and, as we have seen, they constitute the large majority of all cases of true croup, where the exudation appears in the fauces or on the tonsils before it involves the larynx, local applications to the throat are undoubtedly of importance.

The objects of such applications are here, as in diphtheritic angina, to promote the separation of the false membrane, and to prevent its reproduction. To fulfil the first of these indications, many authorities recommend astringent and caustic applications, which cause the pseudomembrane to contract and shrink, and thus tend to promote its separation; while others direct the use of those agents which exert a solvent action upon the exudation.

In the former class, the most advisable are, alum; tannic acid; solutions of nitrate of silver; the astringent salts of iron, especially the tincture of the chloride and the perchloride; dilute mineral acids and carbolic acid.

Of these applications, those which we prefer are a solution of nitrate of silver, in the proportion of 5 to 20 grains to f℥j of distilled water; and tincture of the chloride of iron, in the proportion of fʒss. to fʒij, to the f℥j of water.

The second group comprises chiefly solutions of various salines, as the carbonate of potash, bicarbonate of soda, chlorate of potash; and lime-water.

If any of the astringent or caustic solutions are employed, we would recommend their application only to the patches of exudation in the fauces, since we regard it as highly doubtful whether they actually possess the power of preventing the formation of membranous exudation when applied to the surrounding mucous membrane. Still more should we doubt the efficacy or advantage of introducing such solutions, and especially the more powerful ones, into the larynx; either by pressing a soft sponge saturated with the solution upon the chink of the glottis, or by passing the sponge directly into the cavity of the larynx, as recommended by Dr. Horace Green. (*Observ. on the Path. of Croup, &c.*, New York, 1852.) The practicability of this proceeding is undoubted, and a certain number of cases are on record in which it seems to have been used with success; but we have never resorted to the treatment ourselves.

In cases occurring in older children, who can be induced to inhale the vapor from an atomizer, or to allow a hand-ball atomizer to be used, the various astringent and solvent solutions above mentioned can be applied most satisfactorily in this manner; and, when this is practicable, we would prefer the use of lime-water or one of the alkaline solutions.

In order to obtain the advantage which undoubtedly follows the inhalation merely of the watery vapor, we are in the habit of causing the child to inhale the vapor from slaking lime for a few minutes in every hour, by covering the patient's body with a thick cloth, and holding a vessel containing the slaking lime a short distance below his mouth under the covering. It is doubtful, however, whether any appreciable amount of lime is carried up by the vapor so as to give the additional advantage of its solvent action upon the exudation.

The reader is referred for more detailed discussion of this question of local applications in the treatment of croup, to the remarks upon treatment in the article on diphtheria.

Hygienic Treatment.—The child ought to be warmly clothed, and confined to bed. The temperature of the room should be kept equable, and about 70° F.; the air should also be frequently changed, so as to preserve it constantly pure and fresh.

Owing to the loss of appetite and the pain caused by deglutition, it is often very difficult to induce the little patients to take food, so that this important element in the management of the case requires the utmost tact and attention. During the early part of the attack, the food should consist of light animal broths, beef tea, and preparations of milk. Later in the case, when the violence of the febrile action subsides, or if any symptoms of exhaustion and prostration appear, a small amount of wine and water, of wine whey, or of weak milk punch, should be given.

Ice, given in small pieces to be held in the mouth, should be used very freely, as it relieves the parching thirst and at the same time appears to act favorably upon the inflamed mucous membrane.

Summary of the Treatment.—The general plan of treating this disease should, therefore, in our opinion, be somewhat as follows: The child should be confined strictly to bed. The food should be light, digestible, but nourishing, and, upon the earliest approach of exhaustion, a stimulus should be administered. In the early part of the attack, we should advise the use of revulsives, with mild counter-irritants; topical applications to the fauces if there is any membranous exudation visible, and the internal administration of citrate of potash, with ipecac and small doses of opium, or of chlorate of potash with tr. ferri chloridi. So soon as the symptoms positively indicate the presence of false membrane in the larynx, we should resort to emetics, as directed in our remarks upon those remedies. And finally, after employing these means faithfully but without securing the discharge of the false membrane, while, on the other hand, the symptoms of laryngeal obstruction steadily progress, and the respiration grows more and more difficult, we must consider the propriety of resorting to the operation of tracheotomy, a proceeding which, as will be seen from the ensuing remarks, we approve of under the above circumstances.

Tracheotomy.—The operation of tracheotomy would be apt to suggest itself to a medical man, on his witnessing the closing symptoms of croup, as the very means most likely to afford to the patient relief from the dreadful sufferings under which he labors, and as a possible rescue from impending death. It has accordingly been often resorted to in different parts of the world, at various stages of the disease, but with results that have led to very different conclusions.

In England, for example, the operation was almost universally condemned and abandoned about ten years ago; and in a former edition of this work, we presented the unfavorable opinions of the most eminent English authorities.

It was a matter of very great surprise, at that time, that the results of the operation in the hands of English surgeons should differ so widely from those obtained by the French physicians in similar cases. And, as there was no good ground for believing that sufficient difference existed between the croup of Paris and London, to explain the difference of success in the two cities, it is probable that the great disparity resulted, in part, from the operation being performed in France at an earlier stage of the disease, and in part also from the more careful after-treatment which the patients received.

Within the past few years, however, the operation has been more favorably regarded by English surgeons, and the statistics published show that the proportion of success now obtained does not fall far short of that claimed by French operators.

Thus in a paper read before the Royal Med.-Chir. Soc., in 1857, by Dr. Fuller, it is stated that up to that time 22 cases of tracheotomy in croup had been recorded in England, and that life had been saved in 8 of these, or in 1 out of every 2¾ cases.

In the statistical report of English Hospitals from 1854–59, it appears that the operation had been performed in 15 cases with 4 recoveries, or 1 in every 3¾ cases. Still further, from the statistics published by individual operators in England, since 1858, though it is not to be presumed that we have met with all the cases recorded, it appears that tracheotomy has been resorted to in 63 cases, with successful results in 24, showing a success of 1 in 2⅝.

When it is borne in mind also, that in each of these instances the operation was postponed to the last suffocative stage, and that without exception the operators believe that the proportion of success would have been increased by its somewhat earlier performance, it becomes evident that tracheotomy has acquired a fair position in England among the legitimate operations of surgery.

It is thus advocated by Fergusson in the last edition of his *Practical Surgery:* and Dr. West, in 1859, speaks of it in these terms: "In spite of the unfavorable issue of the few cases in which I have either directed or sanctioned the performance of tracheotomy in croup, I am so far from being opposed to the operation, that my chief anxiety is to make out the indications which may justify me in having more timely recourse to it in future."

In Germany, also, the operation, if not generally practised, is regarded as fully justifiable, and recommended and successfully performed by many of the most eminent authorities.

The statistics of the results there obtained, borrowed from Fock[1] and Voss,[2] show that of 50 cases operated on in the last stage, 24 terminated favorably, giving a success of 1 in $2\frac{1}{12}$, or 48 per cent. Steiner has also recently published (*Jahrb. f. Kinderheilk.*, No. 1, 1868) the results of the operation in 52 cases (33 boys and 19 girls), which show a recovery of 18, or 34.6 per cent. of those operated upon; and in an article upon diphtheria and tracheotomy by Güterbock (*Arch. d. Heilkunde*, 1867, No. 6) 100 cases, operated on in Berlin, are reported, with 33 cures.

It is, however, in France that the operation first obtained, and has since firmly held, the position of a proper and legitimate method of treatment under certain circumstances of the disease. M. Bretonneau, of Tours, was the first who practised it with sufficient success in France to give it some vogue. Since that time, it has been recommended and performed by many different surgeons and physicians in that country, and particularly, as is well known, by M. Trousseau, who has been undoubtedly the most ardent and persevering, as well as the most experienced advocate of the operation. In one of his later publications upon this subject (*Arch. Gen. de Med.*, Mars, 1855, p. 259), he thus boldly advocates it: "For my part, I am quite determined not to allow myself to be discouraged, but to preach tracheotomy with the greater conviction in proportion as its success increases, and did this proportion remain what it was ten years since, I should still proclaim the necessity of the operation, nor cease to say that it becomes *a duty*, a duty as imperative as the ligature of the carotid artery after a wound of that vessel, though death follows the operation as often, certainly, as recovery.

M. Guersent (*Dict. de Med.*, t. ix, p. 376) recommends the operation when the usual therapeutical methods have failed, "as the only means that offers a remaining chance." He adds (p. 377) that he is certain it does not add to the danger of the disease. MM. Rilliet and Barthez (*Mal. des Enfants*, 2ème ed., t. i, p. 337) say that "the utility of tracheotomy in the treatment of croup cannot at this day be denied; numerous cases of children snatched from a certain and imminent death, reply victoriously to any doubts that may be raised as to the truth of this assertion." The authors of the *Comp. de Med. Prat.* (t. ii, p. 587) remark that of late years, "the successful operations have been numerous enough to dispel the unfortunate prejudices which tracheotomy has hitherto inspired." M. Valleix (*Guide du Méd. Prat.*, t. i, p. 388) says that the number of recoveries are "now too numerous to allow any one to think of opposing the operation except by statistics." MM. Hardy and Behier (*Trait. de Path. Int.*, 1850, t. ii, p. 496), in speaking of the contest in regard to the propriety of the operation, say, "But the question seems now to be definitely settled; the operation has succeeded in fact in a little more than one-fourth of the cases in which it has been performed, and, in presence of these results, it may be said to become the duty of the physician to have recourse to it whenever, notwithstanding an appropriate treatment, the general and local symptoms indicate the extension of the false membrane."

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[1] Report on Tracheotomy. Brit. and For. Med.-Chir. Rev., July, 1860, from Deutsche Klinik, 1860.

[2] New York Journal of Medicine, January, 1860.

M. Bouchut (*Trait. des Mal. des Nouv.-nés*, 2ème ed., p. 316) says, that when medical means have failed, and the disease has produced a "state tending towards asphyxia, in which an attack of suffocation might cause the death of the child, there should be no hesitation; a new route must be artificially opened to the external air; tracheotomy must be performed."

At the time most of the above expressions were written, a comparatively small number of operations had been placed upon record in France, but they were quite sufficiently numerous to show conclusively that, if the operation were carefully performed, and the after-treatment skilfully conducted, from 25 to 33 per cent. of the cases would recover. This excellent result is to be in great part attributed to the improvements introduced by Trousseau, and subsequently by other operators, both in the mode of performing the operation, and in the after-treatment of the cases.

Since the publication of the last edition of this work the operation has continued to be so frequently performed in France, that we cannot find space to quote the results obtained by individual operators. The aggregate of their reports, however, as collected by Roger and Seé, Chaillou, Barthez, &c., yield a result of about one recovery in four in a series of over 500 cases.

The proportion of recoveries has varied considerably in different years in accordance with the type of the epidemic; in some years, as 1858, falling as low as 1 in 6.9 (124 operations, and but 18 recoveries), while in other years it has risen even higher than 1 in 3.

It is further to be remembered that these French statistics are chiefly derived from the reports of the Hôpital des Enfants in Paris, and refer, therefore, to a poor class of patients, who have in many instances been subjected to improper and debilitating treatment before reaching the hospital, and who are exposed to unfavorable hygienic conditions while in the institution. When these unfavorable circumstances are allowed their full weight, it must be conceded that the operation of tracheotomy has achieved a considerable share of success in France, and has fully justified the eloquent and enthusiastic advocacy of Trousseau.

In America, tracheotomy has been resorted to but rarely until within the past few years. The statistics which have been lately published, however, fully suffice to show that, in the hands of American physicians, it has been very nearly, if not altogether, as successful as it has abroad. Dr. H. H. Smith (*Oper. Surg.*, 2d ed., vol. i, p. 473) gives the results of 26 operations performed in this country, of which 9 recovered. Dr. Gay (*Boston Med. and Surg. Jour.*, Jan. 27, 1859, et al.) reports 13 operations, with 7 cures and 6 deaths; and other operators in Boston have performed the operation in all 15 times, with 7 cures and 8 deaths. But by far the most extensive statistics have recently been published by Dr. A. Jacobi, of New York (*Amer. Jour. of Obstet.*, May, 1868, pp. 13 to 65), derived exclusively from the practice of physicians in that city.

The following table shows the results obtained:

Operator.	No. of cases.	No. of cures.	Percentage of success.
Jacobi,	67	13	19½
L. Voss,	43	10	23⅓
E. Krackowizer,	55	16	29
W. Von Roth,	48	11	23
Total,	213	50	23½

In this city the operation has been as yet but seldom resorted to, and with but moderate success, owing to the fact that in nearly every instance it has been postponed until the child was almost moribund. The following table embraces certainly the great majority of the operations that have been performed; for a knowledge of which we are to a great extent indebted to the courtesy of the operators, since but few of them have as yet been placed on record:

Name of operator.	No. of cases.	No. of cures.
Physick,	2	0
Goddard,	2	0
Page,	1	0
J. Pancoast,	6	3
R. J. Levis,	11	1
T. H. Bache,	1	0
A. Hewson,	1	0
H. Lenox Hodge,	3	2
J. H. Packard,	2	0
T. G. Morton,	1	1
Total,	30	7 or 23.3 per cent.

Finally, to sum up the statistics given above, although even this aggregate does not include by any means all recorded cases, Jacobi states (*loc. cit.*), that out of 1024 operations of tracheotomy, performed in various parts of the world, but principally in Europe, 220 or 21.48 per cent. recovered.

It is evident, therefore, that wherever this operation has been practised in true croup, a considerable proportion of cures has been effected; but in order to form a clear opinion as to the real merits of the operation, it is necessary to have some idea as to the number of subjects that might have recovered without a resort to it.

This is very easily arrived at in this country, since we believe that it is never performed here except as a last resort, when the patient is manifestly in great danger of death, or absolutely moribund.

In regard to the French operations, it is not so clear whether some of the patients, who recovered after the operation, might not have been so fortunate without it, particularly as M. Trousseau formerly recommended that it should be performed so soon as we can be certain that the larynx contains false membranes. But then it is generally understood that he was not called to many of the cases upon which he operated until all other means had failed, and the child had fallen into an apparently hopeless condition. To elucidate this matter, we shall quote the statements made by M. Valleix, one of the most accurate and impartial of writers. M. Valleix (*loc. cit.*, p. 388–9) tells us that he collected together 54 cases of undeniable, well-marked true croup, treated without the operation, and found that 17 had been cured. Then, examining what had occurred in regard to the operation, he found, as M. Bricheteau had done before, that nearly 1 in 3 had recovered, a success almost precisely the same as had taken place in the cases treated by medical means alone. "But," he goes on to remark, "there is a consideration of very great importance, one which gives an altogether different value to tracheotomy, to wit, that in the immense majority of instances, the operation was performed under the most discouraging circumstances, and only when all other methods of treatment had proved useless, and the severity of the symptoms, and the near approach of asphyxia, indicated impending death. . . . . So that it follows that tracheotomy should be regarded, in connection with croup, as a genuine medical victory, the honor of which belongs to M. Bretonneau, and all preconceived views should fall before the actual facts." We have here the evidence of a most competent witness, living on the spot, to convince us that the operation is not resorted to in France, at least generally, early in the disease, but is performed only as a last resource, when the chance for the patient from the efforts of nature, or from medical means, is almost null. How, then, can we resist the conviction that tracheotomy does afford a sufficient probability of success, after other means have failed and death is fast approaching, to render a recourse to it at least justifiable, if not almost compulsory?

The second point to be examined in discussing the propriety of the operation is, whether it be in itself dangerous.

From the opinions expressed by authors upon this subject, it appears that the only serious danger attendant upon the operation is the occurrence of hemorrhage. When performed for the removal of foreign bodies from the air-passages, the patients almost always recover if the foreign body do but escape. M. Ollivier (Art. *Larynx, Corps Etrangers, Dict. de Méd.*) says that the success of the operation is, so to speak, certain, when it is performed early. Liston disapproves of the operation in croup, but states that it is not attended with much danger. Skey regards it as an operation of some difficulty and danger, from the irregularity in the distribution of the vessels, and the existence of numerous veins which may bleed profusely. M. Boyer does not regard it as dangerous, and states that the only danger is from the occurrence of venous hemorrhage into the trachea, and not from the amount of blood lost. Chelius says that it is dangerous below the cricoid cartilage from anastomosis of the thyroidean arteries, from the presence of venous plexuses, and sometimes from a deep thyroidean artery. Velpeau speaks of the venous hemorrhage as alone dangerous. Trousseau states that he has performed it more than 200 times, and has met with but a single fatal accident in all of these. Dr. Pancoast, of this city, who has operated in more than 6 cases of croup, and a number of times for the removal of foreign bodies in the air-passages, has never met with any serious difficulty in the performance of the operation, nor with any accident which he could suppose might have affected the life of the patient. Dr. H. H. Smith (*op. cit.*, p. 474), when commenting upon the great disparity of the mortality after tracheotomy, when performed for removal of foreign bodies, and when for the relief of croup, remarks that it is very evident that the dangers which ensue upon incising a healthy trachea are comparatively slight, and that the great mortality which has attended the operation when performed for the relief of croup, must be due to some other cause than the mere incision of the windpipe.

If, then, it is the uniform testimony of those experienced in the matter that the operation is in itself alone but slightly dangerous to life, so that its performance adds but little to the danger of the patient; if it affords immediate relief to the suffocation which threatens to be soon fatal, and at least gives additional time, during which the gravity of the disease may subside; if, further, as we think has been most conclusively shown by the statistics quoted, it has unquestionably saved the lives of a considerable number of those upon whom it has been performed, it is difficult to avoid the conclusion that it is our imperative duty to resort to the operation under certain circumstances.

That some who have been operated upon might have recovered without it, is highly probable; but the uncertainty as to the absolute necessity of resorting to it in any individual case is not even so great, probably, as that which exists in règard to many other surgical operations, and to many medical applications.

Our own plan, then, is to try faithfully all medical means; and, being satisfied of their powerlessness and of the certainty of a fatal issue to the case without the performance of tracheotomy, to inform the parents of the inability of mere medical means to afford relief, and to propose the operation to them, setting before them the great probability of its not averting death, but still strongly pointing out the fact that it does not add to the danger of the case, but gives so much additional chance for life that about 1 in every 4 operated upon recovers.

Should they throw the whole responsibility upon us, we should, without hesitation, advise the operation. Our grounds for so doing are very simple, and have been before indicated. The operation does assuredly frequently save life. It is not in itself attended with any great danger. It cannot increase the danger of the patient's position, but certainly gives an additional chance of escape from the disease; and, lastly, it mitigates, in a remarkable manner, the sufferings of the patient. On several occasions, indeed, we have been told by the parents, after the death of their child, that they were very glad it had been performed, since, at all events, it had removed the frightful gaspings and strugglings for breath which had previously convulsed the whole frame of the poor little sufferer, and had rendered his last hours easy and tranquil.

If we decide that tracheotomy is justifiable, it becomes all-important to determine the period of the disease at which we should have recourse to it.

M. Trousseau formerly laid down the rule that it was to be performed so soon as it was certain that false membranes had formed in the larynx. He fixed upon this as the proper moment, because he believed that death was, under these circumstances, almost inevitable without the operation.

This opinion is, however, readily proved to be untenable. We have already learned from M. Valleix that of 54 perfectly well-marked cases collected by himself, treated medically (without the operation), 17, or about a third, recovered. If we add to this that, of 35 cases seen by ourselves 15 recovered without the operation, it becomes very clear that the mere presence of the exudation in the larynx is not sufficient warrant for a resort to the operation.

Accordingly, most authorities advise that we should wait until medical means have been fairly tried. Thus, MM. Rilliet and Barthez (*op. cit.*, t. i, p. 340), in discussing the period at which the operation ought to be performed, conclude that it should not be resorted to until the means that have succeeded in other cases have been fairly tried, and it has become evident that they must fail. They advise the practitioner not to wait, however, too long a time, but to operate even early should the patient suffer a paroxysm of suffocation so severe as to make it probable that another might prove fatal. So, too, Mr. James Spence, in a valuable paper on tracheotomy (*Edin. Med. Jour.*, Feb., 1860), states, as the result of his large experience, "that if, in a case of croup, all measures have been actively tried, if the hard, ringing cough has become suppressed, and the respiration is evidently imperfect, as shown by the contracted and depressed appearance of the cartilages of the ribs, and the occasional severe paroxysms of dyspnœa, the operation is fully warranted. When the paroxysms become more and more frequent, and when the dyspnœa is rather persistent than paroxysmal, with turgid or pale lividity, the operation is the little sufferer's only chance for life."

The same course is, we believe, universally pursued in this country, and, as the reader will recollect, corresponds precisely with the advice given in our remarks on the medical treatment of true croup.

The prime indication for the performance of the operation is, then, the degree of laryngeal obstruction as shown by the characters of the respiration, the cry, and cough.

It should, however, be carefully borne in mind that great dyspnœa, or even asphyxia, when intermitting, do not so imperatively claim operative interference, since cases where the dyspnœa is of this character may recover without the operation.

When, however, despite the use of all medical means, and especially the repeated administration of emetics, the dyspnœa grows steadily and progressively greater; when there is marked hissing laryngeal stridor, and, at each inspiratory effort, recession of the base of the thorax; when, in addition, the voice is whispering or suppressed, and the cough short, smothered, and muffled, the operation should, we think, be unhesitatingly performed.

In thus defining the conditions under which tracheotomy is called for in croup, it is clear that we are not to be influenced at all by the mere period of the disease as measured by time, but that, whenever the above symptoms are present, the operation is indicated.

There can be no doubt, however, of the far greater success of the operation when performed in the early period of the attack, before the patient's strength is materially impaired; and it is, therefore, highly desirable that the indications which render its performance necessary should be appreciated so soon as they appear.

A still further argument in favor of the timely performance of the operation is adduced by Dr. George Johnson (*British Med. Jour.*, Jan. 15, 1870), who dwells upon its value at an early stage, when the indications are present, on account of the danger of œdema of the lung from venous congestion, and of the coagulation of the blood in the pulmonary artery.

Trousseau, also, in his last publication upon this subject (*Clin. Méd.*, 2d ed., t. i, p. 450), speaks as follows: "I wrote in 1834, and repeated in 1851: so long as tracheotomy was not a trusty weapon in my hands, I said, we should operate as late as possible; but now that I can number many successes, I say, we should operate as early as possible. In removing from this assertion whatever may seem too absolute, I still affirm it, by saying, that *the chances of the success of the operation are so much the greater in proportion as it has been the earlier performed.*"

Notwithstanding this, however, should we be called to a case where the last stage of asphyxia has been reached, it is still not too late to perform the operation. Thus, in one of the cases that occurred in our own practice and which ended favorably, this condition was fully developed, and the bluish skin, drowsiness, and insensibility to pain, showed that the patient had already sunk into very advanced asphyxia.

Perhaps we cannot do better in closing our remarks upon this point than to quote the concise and forcible axiom laid down by Archambault: "We should never operate too late; it is never too late to operate, so long as death is not actually present."

There are, however, certain conditions which have been thought by many authorities to contraindicate the performance of the operation, even under the circumstances above described. The first of these is the very early age of the patient, and it has been advised to refuse the operation in all cases occurring under the age of two years. It is unquestionably true, as might be expected, that age exercises a most powerful influence upon the prognosis after the operation, owing partly to the difficulty in performing it on account of the narrowness of the trachea and the shortness of the neck, but chiefly to the deficiency of vital power, and to the difficulty of nourishing the infant afterwards. Notwithstanding these influences which render the prognosis so unfavorable in tracheotomy before the age of two years, there are so many successful cases on record that the most tender age can no longer be regarded as a positive contraindication. The following list embraces the names of the operators and the age of the infants in the cases which have been successful at a very early age:

Baizeau, . . .	at	10	months.	Vigla, . . .	at	17	months.
" . . .	"	15	"	Potain, . . .	"	18	"
" (in hands of his colleague),	"	15	"	Moutard-Martin, .	"	18	"
Isambert, . . .	"	16	"	Trousseau, . . .	"	13	"
Archambault, . .	"	13	"	Barthez, . . .	"	13	"
" . .	"	18	"	" . . .	"	7	"
Roger, . . .	"	19	"	Maslieurat Lagemand,	"	23	"

In adults, on the other hand, tracheotomy in croup is less successful than in children, probably because, as Trousseau suggests, the form and size of the larynx allow the pseudo-membrane to extend deeply into the bronchia before producing the symptoms of croup.

There is another condition which, it is thought by many, ought to constitute an insuperable bar to the operation, and the possible existence of which, in any case, is one of the most serious objections that has been brought against its performance. The condition to which we allude is the presence of pseudo-membranous exudation in the bronchia.

The existence of this condition must greatly lessen the chances of a successful operation, but that it renders success impossible, as has been supposed, cannot be admitted. MM. Rilliet and Barthez (*op. cit.*, 2ème ed., t. i, p. 338) say: "It has been said that one contraindication was the presence of false membrane in the bronchia. But, besides the fact that the symptoms denoting its presence are uncertain, we cannot see in this a positive objection to the operation. Recovery has been known to occur, in effect, after the rejection of bronchial false membranes, and we were ourselves witnesses of a remarkable example of this kind. And is there any better mode of facilitating the escape of foreign bodies than by opening to them a passage below the larynx?

Under such circumstances, we must expect, to be sure, a greater mortality than under more favorable conditions. This opinion is, moreover, that of M. Bretonneau." Numerous cases are indeed on record, and we have ourselves met with such, where, after the operation, large membranous casts of the trachea and bronchia, which could certainly never have escaped through the larynx, have been discharged through the tracheal opening, and their escape followed by complete recovery.

It appears evident, therefore, that if in such cases, when death is even more surely imminent than in those instances when the exudation does not extend below the larynx, tracheotomy affords even a very slight additional chance of recovery, it should be performed despite the fact that the child will in all probability die.

But apart from this consideration, it must be borne in mind that statistics prove that the false membrane extends below the larynx in about one-third of all cases, and still further, that there are no means by which we can with certainty determine in any individual case whether such extension has taken place or not.

It was at one time thought that auscultation might afford the desired information, but more careful observation has shown that it is not to be depended upon. As already said, in most cases the laryngeal stridor is so loud as to mask all chest-sounds, and, even when this does not happen, we have frequently observed that no definite and reliable information is to be gained from physical examination. The following cases may be quoted, out of the number on record, besides several that we have ourselves seen, as proving this statement. MM. De La Berge and Monneret (*Comp. de Méd. Prat.*, t. ii, p. 587) mention a case in which they could not believe that the bronchia contained false membranes, as the vesicular murmur was extremely pure and was heard everywhere; and yet, during the operation, a false membrane was drawn out, which represented the trachea and the division of the principal bronchia. The child died in 15 hours.

The late Prof. William Pepper, of this city, reported 2 fatal cases (*Summary of Trans. Coll. Phys.*, vol. iii, No. iii, p. 106) in one of which "distinct vesicular murmur could be heard throughout the lungs, marked only occasionally by sibilant and sonorous râles," a few hours before tracheotomy was performed. The child died 20 hours after the operation, and the exudation was found to implicate the larynx, trachea, the large bronchia, and even some of the smaller ramifications. In the other case, the state of the respiration was carefully examined the day before death, and not the least respiratory murmur could be heard over any part of the chest, and yet in this instance, the exudation was confined strictly to the larynx; not a vestige of false membrane was to be found either in the trachea or bronchia.

In a case recently attended by us, where tracheotomy had been performed, so that all laryngeal stridor was absent, auscultation, eight hours before death, revealed quite strong respiratory murmur, much obscured by snoring bronchial râles. The antero-lateral parts of the chest were alone auscultated. Death occurred somewhat suddenly from the lodgment of a very large tubular membrane from the left bronchus in the trachea: and at the autopsy there was a tubular membrane found extending throughout the trachea, and through the right bronchus to its third divisions. The left lung was collapsed and congested; the right one distended and emphysematous.

Since, then, we can learn little or nothing from auscultation or any other means, as to the presence of false membrane in the bronchia, the question becomes one of expediency, so far as this contraindication is concerned, whether to leave two-thirds of the patients, many of whom could certainly be saved by the operation, to perish without an effort to save them, because one-third *must* probably die; or to perform the operation, with very little prospect of success in one-third, for the sake of the chance of saving many of the remaining two-thirds who must otherwise perish.

The presence of pneumonia is also universally recognized as greatly lessening the chances of recovery after tracheotomy. It must be borne in mind, in regard to this point, that pneumonia is frequently overlooked, and indeed that it frequently cannot be recognized on account of the loud tracheal râles which hide all auscultatory sounds; while, on the other hand, its presence may be simulated by the occurrence of collapse of some portion of the lung, owing to occlusion of the bronchus leading to it. Millard suggests that the degree of dyspnœa may be of service as indicating the presence or absence of pneumonic complication. Thus he has found that in croup not thus complicated, the rate of respiration is from 32 to 48, while when pneumonia is present, it rises above 50. It is probable, also, that by a careful study of the temperature, the occurrence of pneumonia may be suspected by a marked elevation of several degrees. Pneumonia of one lung is not, according to Guersent, a contraindication, nor is even double pneumonia regarded by some operators as absolutely interdicting the operation, though at the same time we are not aware of a single instance in which it has been successfully performed where this condition was unquestionably present.

Another condition in which tracheotomy is thought by many to be contraindicated, is when membranous croup occurs as a secondary affection, during the course of some constitutional disease other than diphtheria, as, for instance, scarlatina, measles, or pertussis. Such cases were regarded even by Trousseau as absolutely unfit for operative treatment. Still, that this contraindication, although of the greatest weight, does not entirely forbid tracheotomy, is shown by a case of croup following scarlatina, in which Dr. Voss operated, and the child survived 31 days, the tracheal wound being nearly closed. Millard also, in his excellent essay on tracheotomy (*De la Trachéotomie dans le Cas de Croup*, Paris, 1858), records 3 cases of croup secondary to measles, successfully treated by operation. He regards croup occurring in the course of pertussis as far less unfavorable, since the violent cough favors the expectoration of the false membranes.

There remains, finally, one condition to be indicated in which the operation is, in the almost unanimous opinion of authorities upon this question, absolutely contraindicated. We refer to the cases of profound general diphtheritic infection, where the danger of the child depends upon the constitutional disease, even more than upon the laryngeal obstruction, where the blood is gravely altered, and the well-known tendency exists to the formation of pseudo-membranes upon all abrasions or wounds, so that in all probability the operation would merely serve to invite the extension of the exudation.

Trousseau opposes the operation under such conditions, in the following words: "If the diphtheritic infection have profoundly attacked the constitution; if the skin, and especially the nasal passages, are occupied by the specific inflammation; if a frequent pulse, delirium, and prostration show the system to be deeply poisoned, and if the danger is rather from the general condition than from the local lesion of the larynx and trachea, *the operation ought never to be attempted*, for it is invariably followed by death."

Even under this most unfavorable of all conditions, however, there are not wanting some operators of wide experience, who still recommend the operation: thus Jacobi (*loc. cit.*) asserts, that whenever the indication of suffocative dyspnœa, steadily increasing and not relieved by emetics, exists, he would operate despite any complications, general diphtheria, or anything else, and uses this powerful language: "Seeing a person suspended by the neck and being strangled, we should hardly investigate the propriety of cutting the rope from the point of view that the sufferer might be or is affected at the same time with tuberculosis, cancer, or diabetes."

After a careful review of the entire question, we believe that the facts upon record justify the following conclusions: that the condition of success which excels all others is the predominance of the characters of asphyxia; that when these are so marked that death is imminent, the operation is justifiable despite any complications which may coexist, save perhaps the presence of grave general diphtheritic infection; and finally that, when no such contraindication is present, and the dyspnœa is continuous and increasing despite all other treatment, the operation is positively indicated, and it becomes the duty of the practitioner to recommend its performance, and, if the decision be intrusted to him, to unhesitatingly assume the responsibility of operating.

We have already indicated with sufficient clearness the influence which the age of the patient, the period of the disease, and the character of the epidemic exert upon the results of tracheotomy. But we would again allude to the marked manner in which the result is modified by the character of the previous treatment, and to the fact that its success is very much interfered with by the earlier employment of any debilitating measures, such as were, until lately, but too frequently adopted.

We have more than once been asked by the parents of children, upon whom tracheotomy was about to be performed, or who had actually undergone it, what influence would be exerted by the effects of the operation, should it be successful, upon a subsequent attack of croup; and since, as has already been seen from the cases quoted by us from our own experience, second attacks of croup are not very rare, it is interesting to know, that so far the statistics which bear upon this question tend to show that a previous attack of croup cured by tracheotomy is a favorable condition for its performance in a subsequent attack. Thus of 5 cases, collected by Millard, in which the operation was performed for the second time, every one recovered. The second operation was uniformly found much easier, on account of the cicatrix of the former incision serving as a guide, and also on account of the slight amount of the hemorrhage.

MODE OF PERFORMING THE OPERATION.—Tracheotomy being an operation which all physicians, whether experienced or not in the use of surgical instruments, are liable to be called upon to perform at a moment's notice, no apology is needed for the introduction here of the details of its performance. The following account is in great part borrowed from the pages of that most experienced tracheotomist, Trousseau,[1] and from a very complete and practical discussion of the operation by F. Howard Marsh, Esq.[2]

The child should be carefully wrapped up, so as to avoid all exposure to cold; and if an anæsthetic is to be employed, should be allowed to sit or lie in any position he may choose during its administration, as the constrained position necessary during the operation tends to increase the difficulty of breathing. He should then be placed upon a table, furnished with a thin mattress, and a folded pillow or roll of cloth should be placed under the shoulders and back of the neck, so as to put the skin of the throat upon the stretch, and render the trachea prominent. If the operation is performed during the day, the table should be drawn close to the window, and the patient's face directed *toward* it, so that a full light may fall upon the throat; if, however, it be at night, and there is not sufficient gaslight, a special assistant must be intrusted with the duty of holding the candles or lamp. An assistant is also needed to stand behind the patient and hold the head securely; and another, whose duty shall be to draw aside the successive layers of tissue and the bloodvessels with a hook, and to sponge the wound from time to time.

The instruments needed are a sharp-pointed, slightly curved bistoury; a blunt-pointed bistoury; two flexible hooks; a dilator to stretch the incision in the trachea so as to favor the introduction of the canula, and made like a pair of curved dressing forceps, with a little spur projecting backward, so as to catch in the tissues and prevent its displacement; and finally a canula. The size and form of this canula are matters of great importance; and of late years several marked improvements have been effected in them. The calibre of the canula should, as first clearly directed by Trousseau, be as large as possible without interfering with its easy introduction into the trachea, and its curve should be that of a quarter of a circle.

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[1] Clin. Méd., 2ème ed., tom. i, p. 414 et seq.

[2] St. Barth. Hosp. Rep., vol. iii, p. 331 et. seq.

In regard to this very important question of the size of the canula, we are indebted to Mr. Marsh (*loc. cit.*) for a series of observations, which appear to indicate that a tube somewhat smaller than that recommended by Trousseau, Fuller, and others, may be equally efficient and yet less irritating. By a series of careful measurements of the respective diameters of the trachea and cricoid cartilage, he established the fact that the latter diameter is almost invariably less than that of the trachea, to an extent varying from $\frac{1}{40}$th to $\frac{6}{40}$ths of an inch. If, therefore, as his measurements show, the diameters of the trachea are as follows: during the first two years of life, $\frac{10}{40}$ths of an inch; in the third year, $\frac{11}{40}$ths; in the fourth and to the seventh, $\frac{14}{40}$ths; in the eighth and ninth, $\frac{15}{40}$ths; and in the tenth, $\frac{16}{40}$ths; it will be seen that a canula having a diameter of $\frac{9}{40}$ths of an inch will answer for children between the ages of 1 and 4 years; one of $\frac{11}{40}$ths for children between 5 and 8 years; and one of $\frac{12}{40}$ths for children between 9 and 12 years old.

It may be added that after the 12th year the diameters of the cricoid cartilage and trachea increase so rapidly, that the canula now usually made for adults, with a diameter of $\frac{14}{40}$ths of an inch, is rather small for children between 14 and 16 years old.

The length of the canula should be sufficient to cause it to reach from $\frac{1}{2}$ to 1 inch below the inferior angle of the wound in the trachea.

The canula must also be double, the outer tube having a broad collar in front, with holes through which the band which passes around the neck and secures the canula in position, may be passed and tied. It should also be furnished with a key, which plays easily in a notch on the upper part of the inner tube. This inner tube must so fit the larger one, as to be readily removed and replaced, being secured in position by the little key above mentioned.

In some canulas a still further improvement is introduced, by having the outer tube and collar merely yoked together by means of two arches on the collar, which receive small outjutting bars at the sides of the upper extremity of the outer tube, so that this can shift its position according to any pressure it may receive.

There is also a canula recommended by Fuller, called the "bivalve canula," the outer portion of which is not a tube, but consists of two narrow lateral blades, which are easily compressed by the finger and thumb into the form of a thin wedge, and expand again when the pressure is removed. This instrument supersedes the need of any dilator, and has the great advantage of being readily introduced. It is evident, however, that it must produce much more irritation while in position, than a tubular canula, and in addition, when the inner tube has been removed, as is frequently required, its reintroduction causes pain and irritation, from the constriction of the mucous membrane which has bulged inward between the blades of the outer portion. Mr. Marsh, therefore, advises that when there is any difficulty in introducing the canula at the time of the operation, a Fuller's tube should be used, but that this should be exchanged on the second day for one whose outer portion is tubular.

Although it is almost the universal practice to introduce a canula at the time of operation, its use has been objected to by several good authorities, as apt to cause inflammation and ulceration of the trachea, and to favor the development of pulmonary complications; and several plans have been suggested for the separation of the edges of the tracheal wound. Thus Mr. Adams, of the London Hospital, recommends the introduction of a strong metallic wire speculum, such as are frequently used in operations on the eyes, and Dr. Pancoast, of this city, employs a pair of blunt leaden hooks.

In addition to the instruments already enumerated, some operators, following the practice of the Dublin surgeons, use a hook or tenaculum to fix the trachea, while the incision is being made through its rings. This proceeding has certain advantages, especially when it is designed to excise a portion of the trachea, or in case of venous hemorrhage, as the trachea can be raised above the pool of effused blood and speedily opened, which will usually check the bleeding. It is also of service in young children, because the trachea is then so pliable and yielding, that, unless the hook be used, its anterior wall may be easily driven in front of the point of the scalpel, till it is nearly or quite in contact with the posterior, in which case the latter also may be wounded. Trousseau, Millard, and others, however, strongly object to this practice, believing it to be dangerous to so fix the trachea and oppose the movements connected with the performance of the function of respiration which is already so much impaired. Our own observation would go to show that, while the advantages to be gained from fixing the trachea are undoubted, especially in young children, the dangers have been somewhat exaggerated.

It has been recommended by several high authorities—Lawrence, Carmichael, G. H. Porter, Brainard, Fergusson—to excise a small piece of the walls of the trachea. By some this has been adopted with the view of dispensing with the use of a canula, but it is claimed that, even when one is employed, this practice renders its introduction more easy; that the tube fits the oval opening thus made much more accurately than a mere slit, produces less pressure upon the edges, and consequently is not so apt to cause caries of the tracheal rings. It seems never to be followed by narrowing of the trachea after the canula has been removed, as might be apprehended.

This practice is followed by Dr. Pancoast, of this city, who, in the case he describes, excised an elliptical piece about one-third of an inch long and two-tenths of an inch broad, from the front part of the third, fourth, and fifth rings of the trachea. As already said, he does not employ either a canula or dilator, but holds apart the edges of the wound made in the soft parts over the trachea by means of a piece of thick leaden wire, bent so as to form hooks at either end. The wire is of such a length as to fit accurately around the neck when the hooked ends are placed within the edges of the incision, and thus keep up just sufficient traction in opposite directions to maintain the wound open.

In regard to the operation itself, almost all who have had much experience in it direct that it must be performed with great deliberation and care.

The incision through the skin should be made precisely in the median line of the neck, and should extend from the cricoid cartilage to a little above the sternum. The slight white fibrous line which marks the interspace between the sterno-hyoid and sterno-thyroid muscles should then be followed as a guide for the next incision, and the muscular masses drawn aside by hooks.

The trachea is now exposed with the isthmus of the thyroid gland, and, occasionally, large thyroidean veins lying upon it, and great care must be observed to avoid wounding these on account of the troublesome hemorrhage which is apt to follow. A still further reason for this caution is the occasional existence of an anomalous distribution of arteries, by which a branch of considerable size, or even the innominate artery itself, passes over the trachea directly in the course of the wound. Any bloodvessels may be drawn aside by hooks, and the isthmus of the thyroid gland may either be treated in the same way, or, if it cannot be drawn away far enough to allow a sufficient incision of the trachea, may be ligated in two places and divided between (Brainard, of Chicago), although, when possible, this had better be avoided. The trachea, having been thus carefully exposed, should be punctured just below the cricoid cartilage, and the probe-pointed bistoury being introduced, and its edge guarded by the nail of the index finger of the left hand, the opening should be enlarged downwards to the extent of two or three tracheal rings.

It usually occurs that there is some hemorrhage during these incisions; but if it be venous and moderate in amount, the opening of the trachea should not be deferred, as the re-establishment of respiration will usually speedily check it.

So soon as the trachea is incised, the dilator should be instantly introduced with the blades closed; and so soon as in position these should be moderately opened. Air now enters readily, and there is a discharge of mucus, fragments of false membrane, and blood, through the opening. The canula should then be introduced upon the dilator as a guide, its entrance being evinced by the increased facility of respiration, and the escape of mucus and blood through its calibre. A guard of india-rubber or a disk of waxed cloth should then be placed between the guard of the external tube and the skin, to prevent any irritation or chafing, and the canula may be fastened in position by a tape passed around the neck.

Should blood bubble up by the side of the canula, as Géraldes observes, the wound in the trachea has been made too large, so that the blood gains entrance during inspiration, and a larger canula should be at once substituted.

It occasionally happens, as in a case related by Trousseau, that the trachea is lined by a false membrane, which is partly detached and pressed forward by the end of the canula, so that it completely occludes the opening, and thus even increases the asphyxia. When this occurs, the canula should be withdrawn, and an attempt made to seize the false membrane with forceps and withdraw it.

When the operation has been a laborious one, emphysema of the neck may be met with, sometimes extending to a considerable distance, and causing great disfigurement or even seriously complicating the course of the case. It results from a want of parallelism between the cutaneous and tracheal wounds, or from marked disproportion between the size of the tracheal wound and that of the canula, or, as occasionally may happen, from the escape of the canula from the tracheal wound. It has also happened that the inflamed and thickened mucous membrane is stretched over and driven before the point of the scalpel, and so escapes a sufficient division.

It has not been customary to use anæsthetics in the performance of tracheotomy. Fock, however, advises the use of chloroform, and states that he has never, even in extreme dyspnœa, found any ill effects to result from its employment. At first the dyspnœa is increased by the inhalation, but anæsthesia is speedily established, and then the breathing becomes much calmer than before. Dr. Voss, who has also employed it, reports equally favorably of its effects; and Mr. Marsh, who has seen it administered in at least twenty cases, believes that, when carefully and slowly given, it is most beneficial. It must be remembered, however, that, owing to the asphyxia, the sensibility of the child is usually much blunted, so that, even without anæsthesia, the operation has appeared to us to cause but little pain, and has been borne by the little patients with scarcely any struggling.

After-Treatment.—Immediately after the successful performance of the operation, and the satisfactory adjustment of the canula, an almost incredible change occurs in all the symptoms of the patient. The wild restlessness of the little sufferer, with the agonized, appealing glances at those surrounding the bedside, and the frantic clutching at the throat as though to tear it open to admit air, the lividity of the surface, the noisy, hissing stridor of the respiration, all vanish as though by magic. Very frequently the child falls into a placid sleep, the skin and lips regain their normal color, and the breathing becomes regular, full, and nearly as silent as in health. This calm is not, however, to be of long duration; there are frightful dangers still to be undergone, from which nothing but the most assiduous care and skilful treatment can enable the patient to escape with life.

It may, in fact, be asserted that the much greater proportion of success which has of late years attended this operation, is to be attributed chiefly to the more judicious after-treatment which patients receive. Indeed, Trousseau has most truly said, with regard to the importance of this portion of the management of the cases, that tracheotomy, badly performed, but well treated afterwards, will end favorably in a third of all cases; whereas, tracheotomy excellently executed, but badly treated afterwards, will almost invariably be followed by a fatal termination.

It might, consequently, have been added to the contraindications already enumerated, that, unless we can secure constant and skilful attendance upon the case after the performance of the operation, there can be but little hope of obtaining a favorable result.

Wherever it is in any way possible, the constant presence, by day and night, of a physician or student of medicine, should be secured for four or five days after the operation. When this is utterly impossible, all of those engaged in nursing the case should be carefully instructed how to act in the event of any emergency, so that the child shall never be without the presence of some one competent and ready to render the prompt assistance which is frequently necessary to avert instant death. The details of the attention necessary will be given a little further on.

One of the first points to which careful attention must be paid, is to give to the air to be inspired through the canula as much as possible the temperature and degree of moisture that the air attains by its normal passage through the mouth and nose. Various means have been recommended to secure this object; thus, a piece of loose coarse sponge, wetted with tepid water, and enveloped in a piece of gauze, may be applied over the canula; or, as directed by Trousseau, "the neck of the child may be surrounded by a cravat of knitted wool, or a large piece of muslin or gauze, so that the patient expires into this thick tissue, and inspires the air impregnated by the warm watery vapor which the expiration has just furnished."

This is the only means adopted by Trousseau; but we may, in addition, by the aid of a spirit-lamp, keep shallow dishes of water evaporating in the room, and at the same time employ a thermometer to regulate the temperature of the chamber, which should be uniformly kept at from 70° to 72° F., though the air should be changed frequently, so that it may be pure and fresh.

By careful attendance to this clear but long-neglected indication, we not only prevent the rapid drying of the mucus in the canula and trachea, but, as Trousseau asserts, avoid to a great extent the occurrence of pneumonia or bronchitis as sequelæ of the operation.

In regard to the treatment of the wound itself, we have already alluded to the advantage of placing a piece of lint spread with cerate, or a caoutchouc ring, beneath the collar of the canula to prevent any irritation of the skin. No sutures should be introduced into the skin incision, as the efforts during coughing will soon tear them out. Trousseau strongly advises that the edges of the wound should be cauterized daily for the first three or four days, with solid nitrate of silver, in order to prevent the formation of diphtheritic deposit.

It very soon becomes necessary, despite every care to render the inspired air moist, to cleanse the inner tube of the coating of viscid, partly dried mucus which collects on its interior, and to effect this, the inner tube should be removed as frequently as is necessary. The frequency with which this withdrawal is required varies in different cases, but it may be stated as a general rule, that it should be performed from four to twelve times in twenty-four hours.

When the tube is clear, the respiration is almost noiseless, and hence the supervention of noisy breathing is usually the indication of some obstruction in the inner tube, which should immediately be withdrawn and cleaned.

The drying of the mucus in its interior may be partially prevented by dropping, every half hour, a few minims of tepid water into the mouth of the canula, and by smearing the inner surface of the tube with pure glycerin, every two or three hours. Some years ago,[1] Barthez recommended instillations of tepid solutions of chlorate of soda through the canula after tracheotomy, in the hope of effecting the softening of the false membranes, and their more rapid and complete expulsion. Although he was inclined to attribute a beneficial effect to the practice at the time, it appears to have since fallen into disfavor even with its originator.

We have ourselves employed lime-water in several cases, and always with obvious relief. We were induced to use it from its well-known solvent action upon pseudo-membranous exudation, and have generally employed it by atomizing warm lime-water through the canula every few hours, or so often as the breathing becomes noisy and labored, despite the removal and cleaning of the inner tube, from the collection of viscid mucus or pseudo-membrane below the end of the canula. The atomization has been continued for a moment or two, and has usually excited cough, while at the same time it softened the viscid mucus and enabled the child to reject it through the tube. So great, indeed, is the relief at times thus afforded, that in one case the little patient asked frequently that the use of the atomizer should be repeated. In all probability it does good, partly by its mechanical action in exciting cough, partly by the softening effect of the watery spray, but partly also, we are inclined to believe, by the action of the lime upon the mucus and pseudo-membranes. We are also in the habit of directing that the child shall breathe, for a few minutes in every hour, the steam from slaking lime, though in all probability this does not contain an appreciable amount of the lime itself.

It occasionally happens, however, that the breathing becomes noisy and obstructed and remains so even after the withdrawal of the inner tube, and the use of the atomizer. The cause of the obstruction then probably consists in the presence near the end of the canula, either of a collection of dried mucus or of a piece of false membrane too large to escape through the canula. If, under these circumstances, an access of dyspnœa should ensue, the strings securing the canula should be instantly cut and the outer tube withdrawn. If this be followed by the rejection of false membrane and a return of quiet respiration, the canula may be returned; but if there is reason to fear that the trachea contains false membranes too large to escape through the tube, it is better to allow it to remain out permanently.

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[1] Bull. Gén. de Thér., May 30, 1858.

Millard (*loc. cit.*) recommends that the external tube should always be removed at the end of twenty-four hours after the operation, when the track of the wound is usually patulous, being lined by plastic lymph, and after waiting a few minutes for the rejection of false membranes and cauterizing the wound, be again introduced.

In those cases which progress favorably, it soon becomes necessary to decide at what date the canula shall be finally removed. It is evident that this should be accomplished so soon as possible, as the tube acts the part of a more or less irritating foreign body in the neighborhood of delicate and important structures, and yet it is only in rare cases that the patient can endure its removal before the sixth or seventh day.

At the end of the fifth day, therefore, the experiment may be tried of plugging the mouth of the canula with a little roll of wool, to learn in what degree the larynx has become patulous. Should the child be unable to take a single respiration, the experiment may be deferred for several days, but should breathing be performed through the mouth for several minutes, the measure may be repeated daily, in order to gradually accustom the larynx to a resumption of its function.

About the seventh or eighth day the tube may be removed for an hour or two; and, if its abstraction be well borne, it may be finally withdrawn the following day, and the wound closed by bringing its edges together with adhesive plaster. It is very necessary to observe the caution, that the canula must never be removed unless some one competent to replace it is at hand. It occasionally happens, however, that the larynx remains impervious for a much longer time, and cases are recorded in which it has been impossible to remove the canula for fifteen, twenty-five, forty-four (Trousseau), or even one hundred and twenty-six (Fock) days; or even for months or years. The causes which thus delay the period at which the tube can be removed, are summed up by Mr. Marsh (*loc. cit.*), as follows:

1. Obstruction of the larynx by false membranes, which have been known to linger in its cavity for at least fourteen days after the operation.
2. A chronic inflammation and thickening of the mucous membrane of the larynx, which may remain after the acute disease has passed off.
3. A narrowing or complete obliteration of the passage of the larynx, by the growth of granulations above and around the canula.
4. An impairment or complete loss of those functions of the muscles of the larynx which regulate the admission of air through the rima glottidis.
5. Adhesions of the opposed surfaces of the vocal cords.

After the removal of the tube, the wound heals, either by contracting from the circumference toward the centre, when air escapes until the very last day; or the tracheal wound first closes, and the cicatrization then advances externally. The average time occupied by this process of cicatrization, is about one month, though it may be completed in two weeks or be protracted for two months.

Among the results which have been known to follow the prolonged stay of the canula in the trachea, are necrosis of the tracheal cartilages, and ulceration about the wound, or of the trachea around the canula, which, in several cases, has been followed by fatal hemorrhage. Suppuration among the deeper structures of the neck, even extending into the anterior mediastinum, has been noticed in a few instances, when the deepseated tissues of the neck had been much disturbed.

General Treatment.—Having carefully discussed the management of the canula and the treatment of the tracheal wound, it remains to say a few words in regard to the general treatment of the patient after the operation.

The most essential point to be secured is, unquestionably, the proper alimentation of the child. It is, however, frequently very difficult to induce it to partake even of the most tempting food. We should endeavor to persuade it to take, as before the operation, nourishing animal broths, beef tea, milk, custard, chocolate, wine-whey, or weak milk-punch. If, however, these are refused, and the child expresses a desire for any other digestible article of food—as the breast-meat of fowl, finely minced, or the soft portions of oysters, or eggs—the taste should be gratified. Occasionally ice cream will be taken willingly, when other food is refused; or, when both wine-whey and milk-punch are rejected, iced wine and water, or brandy and water will be relished. Unfortunately,. however, it not rarely happens that, owing partly to the soreness of the throat and partly, undoubtedly, to the pain caused by the canula during the movements of the trachea in deglutition, the little patient utterly refuses to swallow more than a mere sip of iced water. Under such circumstances, so serious a complication is abstinence, that Trousseau recommends that it should be forced to take a little food. "Do not fear," he says, "to employ intimidation. In such cases I have often—assuming an apparent severity, the expression of which I have exaggerated—forced the child to eat, and so have prepared the way for a recovery, which, without this, seemed to me impossible."

Even by this means, however, it may be impossible to secure the administration of a sufficient amount of nourishment, and we would then advise the use of nutritious enemata, consisting either of the yolk of one egg, beaten up in an ounce of milk, or of one ounce of beef tea, and given about every four hours. If they appear to irritate the rectum, and are not retained, one or two drops of laudanum may be added to each enema.

In comparatively rare cases there exists, in addition to this unwillingness to eat, a positive difficulty in swallowing liquids. This results from the inaction of the vocal cords and epiglottis, which allow the fluid to pass through the glottis into the trachea and bronchia, causing violent cough and escaping through the artificial opening. The child is so alarmed by this that it sometimes refuses all nourishment, and can only be supported by nutritious enemata. Under these circumstances, Trousseau advises that all liquid aliment should be interdicted, and that the food of the child should consist of very thick soups, vermicelli boiled in milk or broth, hard eggs, eggs very much cooked in milk, and rare-cooked meat, in rather large morsels. If the thirst becomes ardent, he allows pure cold water, taking care to give it either some length of time after, or immediately before, the meals, in order to avoid vomiting. This difficulty in swallowing rarely begins until three or four days after the operation, and does not usually last beyond the tenth or twelfth day. Sometimes, as M. Archambault has suggested, the child is enabled to swallow with ease by closing the canula with the finger at the moment of deglutition, but at other times this fails entirely.

In many cases the difficulty in inducing the child to swallow, after the operation, is so great that all medication must be suspended, excepting the administration of small doses of opium, by the mouth or by enema, which we would advise to be continued.

Whenever it is practicable to give remedies, however—without interfering with the ability and willingness to take food—it is very important to bear in mind that despite the very great relief which the operation may have afforded, it has by no means put a stop to the disease, but has simply afforded the system another chance to overcome and cast off the constitutional affection.

Of course, the use of emetics must be suspended, and so if, on any theoretical ground, any depressing remedies have been employed, they should be discontinued. But we should recommend under such circumstances, that the use of the combination of chlorate of potash, tincture of chloride of iron, and sulphate of quinia, should be persisted in.

We subjoin the histories of two cases of true croup, which have lately occurred in our practice, and which will serve to illustrate clinically the remarks that we have made upon this disease.

In both cases tracheotomy was performed by Dr. H. Lenox Hodge, in one instance with complete success, but in the other with a fatal result.

The first and successful case was under the care of Dr. R. Bolling, of Chestnut Hill, and was seen in consultation by Dr. J. F. Meigs, and, subsequently to the performance of the operation by Dr. Hodge, by Drs. Edward Rhoads and William Pepper.

The second case was visited by both of us from the first; and was attended, after the performance of the operation by Dr. Hodge, with the most zealous and skilful care, by Drs. Wharton Sinkler and M. Longstreth.

Angina with Membranous Exudation on Tonsils—Membranous Laryngitis: Tracheotomy at end of second day—Complete Recovery.

CASE 1. F. W., æt. 7½ years, a delicate child, who at the age of 4 years had suffered from a severe attack of true croup, from which he

recovered without the operation. On December 23d, 1868, he was
ticed to have the symptoms of an ordinary cold in the head, w
slight sore throat, some dysphagia, and laryngeal cough; he was
ited and prescribed for by Dr. R. Bolling. On December 24th
cough persisted, and there was slight coryza and redness of fauc
but without any membranous deposit or any croupy symptoms.

He was ordered small doses of Kermes mineral, Dover's powder, a
nitrate of potash, and counter-irritation to the throat.

At 5 A.M., December 25th, the child, who had gone to sleep quiet
waked in a frightful paroxysm of dyspnœa, gasping, clutching at
throat, and with oppressed whispering voice.

Emetics of alum were given, and produced free emesis, but with
the rejection of any false membrane, nor was any yet visible in
fauces. The powders were continued.

The dyspnœa persisted and grew steadily worse; the voice remai
suppressed. Membranous exudation was noticed in the evening
the tonsils, and during the following night, the obstruction to respi
tion became so intense that, after consultation with Dr. Meigs, trac
otomy was performed by Dr. H. Lenox Hodge. The trachea w
opened just below the isthmus of the thyroid gland. No false me
brane could be seen at the level of the opening, nor was any rejecte

A few hours later it became necessary to remove the canula, cut
oval piece from the trachea, and replace the tube, during which p
ceeding artificial respiration had to be maintained.

The neck was surrounded by gauze. Nutritious enemata, with sm
doses of laudanum, were given every two or three hours. Cream a
brandy were given by mouth, and the attempt was made to give qui
and iron, but the child absolutely refused to take it. The breath
became somewhat easier, but at 9 A.M., December 26th, it was 66, a
the pulse 160.

The internal tube was frequently removed and cleansed of very th
viscid mucus, which rapidly collected in it; and the other treatment w
continued. In the afternoon it became evident that the internal t
was entirely too small, and it was therefore abandoned and the exter
one alone retained. Warm lime-water was now atomized down the t
every two hours, and on the first occasion of its use was followed
the rejection of a large piece of thick, dark-gray, glue-like false m
brane. This was followed by marked relief to the dyspnœa.

The child was kept gently under the influence of opium; and w
nourished by enemata of beef tea, f℥j; brandy, f℥j; tr. opii, gtt.
given every three hours; which were retained unless they provoke
fecal discharge, which happened two or three times. The urine w
passed freely, and was not albuminous.

The respirations were conducted solely through the tube, and o
during sleep fell as low as 32.

December 27.—Still refused to eat, and the bowel also became so
what irritable, so that several of the enemata were rejected. The re
rations varied from 35 to 48; the pulse from 132 to 140. The treatm

was continued; the atomization of lime-water through the tube being repeated every three hours. Towards the close of each interval the face became flushed, and the child grew restless, throwing the arms about excitedly, at times leaping up in bed, and turning round so as to lean forward on the pillows and bury his face in his hand, or else looking round with an appealing expression. The atomization was always followed by cough, and the rejection of pieces of false membrane and thick puriform matter. Towards evening he began to swallow some food.

December 28.—The tissues of the neck had become so much infiltrated and swollen, that the canula was no longer long enough to reach from the cutaneous surface into the trachea; it was in this way pushed forward till it obstructed the tracheal opening and caused great dyspnœa. It was consequently removed, and the child, though much exhausted, sank into a gentle refreshing sleep, with quiet regular breathing. The tube was not replaced, the breathing being readily performed through the wound. There was still marked indisposition to take food, and for a few times he was forced to swallow by holding his nose and pouring beef tea down his throat; this was not, however, continued, as the effort exhausted him very much, owing to his most violent resistance. The discharge from the trachea through the wound was quite fluid, purulent, and very fetid. A solution of carbolic acid, gtt. x, in Oss. of tepid water, was atomized through the wound; and the atmosphere of the room was kept impregnated by atomizing a stronger solution about the chamber.

During the day he swallowed more food; gr. ¼ of opium was given twice; his circulation and respiration improved.

December 29.—Condition still improving. Respirations 28, quite full and deep, without râles; pulse had fallen steadily from 114 to 84, and was more full and strong. The color of surface was better. Respiration carried on partly through the mouth.

December 30.—The child passed a very comfortable day. The respirations were about 24; the pulse 78 to 86, soft, full, and strong; the capillary circulation good. Food was taken much better, the child eating a croquette made soft with cream, the soft part of several oysters, a small piece of breast of partridge cut fine and rubbed up with butter and salt, and drinking sherry wine and water, and rich chocolate. The discharge had lost to a great extent its offensive character. Took gr. ss. of opium at night, and slept five hours quietly.

December 31.—The child's condition was better in every way. The wound was contracting, the edges of the tracheal opening white and clean, and granulations beginning to project over it. The cough was stronger and more laryngeal, and the voice stronger and clearer, though still whispering. A good deal of the discharge was now raised into the mouth and expectorated. The gauze with which the wound had been covered was changed for a piece of patent lint, to encourage the larynx to gradually resume its functions.

From this time the case steadily improved. The matter expectorated grew more and more mucoid, thin, whitish, and scanty, and finally expectoration ceased almost entirely. The general symptoms rapidly improved, though he remained weak and nervous for six weeks. The external wound was covered with patent lint, at first of one, then of several thicknesses, and he gradually regained the power of breathing through the larynx, and of speaking. The larynx seemed quite clear after January 2d, 1869, eight days after the operation. The wound granulated from the bottom outwards, and was entirely cicatrized by the end of six weeks; by which time he was about the house, and had returned to his studies to occupy his mind, as he was very fretful and nervous.

November 1, 1869.—F. W. remains perfectly well, and is indeed enjoying more robust health than for several years before this attack of membranous croup.

Angina with membranous patches on tonsils; Membranous Laryngitis; Tracheotomy on tenth day; Death on thirteenth day (fifty-eight hours after operation). Autopsy.—False membrane extending from tracheal wound to third division of bronchi; right lung emphysematous; left lung collapsed; blood dark and fluid.

CASE 2. K. B., girl, æt. 6 years and 1 month; rather tall for her age. Her parents are healthy; but she herself had suffered much from spasmodic asthma during infancy and first dentition. Since then she has enjoyed good health. On the morning of Tuesday, October 5th, 1869, she appeared unwell with a little croupy cough, which passed off in the middle of the day, and she was allowed to play in the square for a couple of hours. On Friday, 8th, her cough was worse, but still she seemed so bright that she was allowed to play about the room; but in the afternoon she complained of sore throat, and Dr. J. F. Meigs was called and found small patches of exudation on the tonsils.

℞.—Potass. Chlorat., ...	gr. ij.
Tr. Ferri Chloridi, ...	gtt. v.

Every third hour in a teaspoonful of syrup and water.

During the night, violent dyspnœa, with noisy gasping breathing, came on, for which emetics were employed with some relief.

On Saturday, 9th, there were patches of membranous exudation on the fauces and tonsils. The cervical lymphatics were only slightly enlarged. The breathing was difficult and stridulous; the voice feeble, small, usually whispering, but when raised by an effort was rather piping and shrill; the cough was short and smothered. There was no coryza. Treatment continued, and inhalations of the vapor from slaking lime ordered every hour.

On Sunday, 10th.—The child was restless, with at times marked jactitation; face flushed, and expression anxious; respiration labored; inspiration imperfect, with shrill stridor; expiration prolonged and stridulous. No expectoration. Membrane still visible in fauces. No albumen present in urine. Pulse frequent, skin hot and moist. Treatment continued, and cloths wrung out from hot water applied to the throat.

Monday, 11th.—Condition about the same; the degree of dyspnœa varying from time to time with degree of spasm, but the breathing still continuously labored and stridulous. Treatment continued, and frictions with turpentine liniment directed to be made to the throat. Marked unwillingness to eat.

Tuesday, 12th.—There was marked improvement in the child's condition. The breathing was easier and less stridulous; the cough less frequent and looser, with a few thick yellowish purulent sputa; the voice was raised with less difficulty, and was clearer and stronger. There was, however, the same faucial pain and obstinate indisposition to eat. The fauces were still red and swollen, and a small thin patch of exudation was visible on one of the tonsils. The treatment was continued, and the child also took a little port wine and water and beef tea, and had nutritious enemata of egg given every four hours.

Wednesday, 13th.—The condition of the fauces was better, the breathing easier, and the voice more clear. The skin was still heated, pulse frequent, and there was still indisposition to eat.

During the ensuing night the breathing again became more oppressed and tighter, with some return of stridor. The voice also became suppressed and whispering. The circulation was somewhat obstructed, the face becoming flushed, and the lips rather dark.

Thursday, 14th.—These symptoms were aggravated, and in the evening there was marked jactitation and restlessness. The respirations were 40 in the minute, and stridulous, with prolonged expiration; and, during the inspiratory effort, with violent action of the external respiratory muscles, elevation of the shoulders, and recession of the base of the chest and of the epigastrium. There was also complaint of pain at the epigastrium. The cough was infrequent, short, smothered, and muffled. The eyes were anxious, staring and prominent, with large pupils. The pulse was frequent, 140, and small.

During the night there was a steady aggravation of all these symptoms. The respirations rose to 46, and became extremely obstructed, the recession of the base of the chest and at the epigastrium being unusually marked during inspiration. The voice was whispering and almost suppressed; the expression strained, appealing, and anxious; the face deeply flushed and the lips livid. There was the same complaint of constant pain at the epigastrium.

Friday 15th, at 7½ A.M., respirations 36, pulse 136. Tracheotomy was performed by Dr. H. Lenox Hodge, the trachea being opened just below the isthmus of the thyroid gland, and a small oval piece excised from its walls. A good deal of venous hemorrhage occurred during the operation, but stopped immediately after the trachea was opened, and the tube adjusted.

No anæsthetic was used, but the child made no resistance, and evithe base of the neck, which caused complaints of pain about the neck and shoulders.

At 4 P.M. it was observed that the breathing was again growing obstructed, and that there was recession of the base of the thorax during inspiration. Lime-water was freely atomized through the opening, but without causing any discharge of membrane. The difficulty of respiration increased until 5½ P.M., when suddenly symptoms of asphyxia appeared. Prolonged efforts at artificial respiration were made, and life was thus maintained for a short time, but no essential relief was afforded, and death soon followed, on the thirteenth day of the disease and fifty-eight hours after the operation.

The chest was frequently auscultated throughout the course of the case. Before the operation it was impossible to isolate any respiratory murmur, owing to the loud, snoring, whistling, and cooing tracheal and bronchial râles. After the operation, and still more after the final removal of the canula, a faint respiratory murmur could be detected, mingled with the above râles. On the morning before death only was there an obscure flapping sound transmitted to the ear with the tracheal and bronchial râles, but even then it was indeterminate in character.

During the efforts at artificial respiration, a long tubular false membrane was ejected. It had evidently been the immediate cause of death.

AUTOPSY, twenty-four hours after death. *Brain* not examined.

Thorax and Air-passages.—The wound in the neck looked well, without pseudo-membranous exudation. The larynx itself could not be examined. A long false membrane, extending from the tracheal opening down through the right bronchus to the third or fourth division, lay loose in the trachea, having been detached from the mucous membrane. In the bronchia it was still slightly attached, but separated readily on traction. It was firm, very tough, and white, and, in the upper part of the trachea, at least one line thick. Below the bifurcation it was tubular for the rest of its course; and in its terminal portions grew softer and more yellowish. There was also, in the trachea, a large patch (1½ inches long by ½ inch wide) of false membrane, of dull white color, and tightly adherent. Upon raising it, numerous little delicate fibrous prolongations were seen attaching it to the mucous membrane. Beneath this patch the mucous membrane was deeply reddened, dry, excoriated-looking, and slightly roughened by minute elevations. There was no enlargement of the mucous follicles. The vascularity of the mucous membrane diminished in the lower part of the trachea, and was but slightly marked in the secondary divisions of the bronchi. No ulceration was seen at any point. There was no pseudo-membrane in the left bronchus or any of its branches, and the mucous membrane here was less reddened than on the right side. In all probability the false membrane removed immediately after death had come from the left bronchus. The right lung was largely distended, the posterior border dark and congested, but the rest of the organ pale and emphysematous. The left lung was dark, purplish, non-crepitant, collapsed, and yielded on section an abundant flow of dark, airless, bloody serum. No pleurisy or pleural effusion.

Heart.—The left ventricle was very firmly contracted and empty, and the tissue of its walls hard, tough, and florid red. The walls of the right ventricle were relaxed, and the cavity filled with fluid dark blood, without any clots. No excess of pericardial effusion.

The liver and kidneys were gorged with dark blood.

CHAPTER II.

DISEASES OF THE LUNGS AND PLEURA.

GENERAL REMARKS.

It would be difficult, perhaps, to overestimate the importance to the medical practitioner of a thorough knowledge of the different diseases of the lungs and pleura, as they occur in children. The diseases of the respiratory organs—and much the most frequent of them are pneumonia and bronchitis—cause, according to West, very nearly a third of all the deaths under five years of age in England; while not above one child in four dies under that age from diseases of the nervous system, and not above one in seven from those of the digestive system. In this country, it would seem, from the bills of mortality, that a larger proportion of children die of diseases of the digestive than of the respiratory system. But, while this is true, there can be no doubt that the diseases of the latter system are deserving of our utmost attention, since not only are they of constant occurrence and of fatal tendency, as idiopathic affections, but since, also, they frequently appear as complications in the course of other diseases, adding greatly thereby to their severity and danger. In measles, for instance, by far the most frequent cause of danger is the occurrence of some inflammation of the lungs or pleura. In scarlatina and typhoid fever, bronchitis and pneumonia are very common accidents, and recent researches have shown that in hooping-cough, and in all states of great debility and prostration, a certain change in the condition of the pulmonary tissue, to which the term collapse has been applied, is very apt to occur.

The morbid condition of the lung last referred to, that of collapse, is one that has been well understood only within a few years past, and yet it is so important a one, in a practical point of view, as to excite a feeling of surprise that it had not been discovered before.

ARTICLE I.

ATELECTASIS PULMONUM, OR IMPERFECT EXPANSION OF THE LUNG.

The title of atelectasis pulmonum, from ατελης, imperfect, and εκτασις, expansion, was first employed by Dr. Edward Jörg, to designate a condition of the lungs observed by him in new-born children, a condition in which larger or smaller portions of those organs had never been penetrated by air. The respiration of the infant had, in such cases, been only imperfectly established at birth, and some parts of the pulmonary tissue had, consequently, never undergone expansion under the distending influence of the inspiratory act; these undilated parts continued in the fœtal state.

In addition to this *congenital* form of imperfect expansion of the lung-tissue, this condition is met with at all ages of life, though with especial frequency in young children, as the consequence of a *collapse* of portions of the once-expanded lung, or, in other words, of their return to the fœtal or unexpanded state. To this latter form of imperfect expansion, the terms post-natal atelectasis, collapse, and fœtal condition have been given. Before the discovery of its real nature was made, it had often been described also under the well-known names of carnification and lobular pneumonia. We shall designate it by the title of collapse or post-natal atelectasis, while under that of congenital atelectasis pulmonum, we shall describe the congenital variety of imperfect expansion.

CONGENITAL ATELECTASIS.

Anatomical Appearances.—In congenital atelectasis the parts of the lung most frequently affected are the posterior portion and lower edge of the inferior lobes, the middle lobe of the right lung, and the languette and lower edge of the upper lobes. In some instances that we have examined, the greater part of the lower lobes of both lungs, while, in others, still larger portions of these organs have been found to present this condition. The imperfectly expanded portions of the lung are of a dark-red, or purplish color, and are diminished in size, so as to be depressed below the level of the healthy parts. They are solid to the touch, and yet they have not lost their cohesive properties, as they are neither friable, easily torn, nor readily penetrable by the finger; their cut surface is perfectly smooth; they do not crepitate under the finger, and no air-bubbles are seen in the fluid squeezed out by pressure; they sink when thrown into water. They, in fact, resemble exactly the fœtal lung. The most convincing proof of the real nature of this condition is obtained by the inflation of the lung. When this is done, the depressed, hard, and dark-colored portions—unless the subject from whom the specimen has been taken may have lived long enough to have allowed the different tissues of the lung to become adherent—rise to their natural level, become elastic, soft, and crepitating, and change, under the influence of the entering air, from a dark and livid tint, to the rosy or pink color of healthy pulmonary tissue. In recent cases, this inflation is performed with great ease and with perfect success, while in other instances, in which the child has lived for some weeks or months, the distension is either effected only by strong efforts, or in a very imperfect manner, or it may fail entirely, owing to some permanent change having taken place in the tissues of the unexpanded portions. In a case that occurred to ourselves, the subject of which died at the age of fourteen months, of acute pleurisy of the right side, after having presented, at birth and throughout its short life, many of the symptoms of atelectasis, the inferior two-thirds of the lower lobe of the left lung exhibited in the greatest perfection all the atelectasial characteristics. The whole of the unexpanded part was distended by means of inflation with a blowpipe, but only after repeated and powerful expiratory efforts; and Dr. E. Wallace, who made the examination, assured us that he was obliged to use a degree of force much greater than he ever employed to inflate healthy adult lung.

In some cases, there are found small patches of vesicular emphysema associated with the areas of pulmonary collapse. If, in consequence of commencing post-mortem decomposition, there has been any development of gas in the tissue of the lungs, it is seen, by the aid of a lens, in the form of irregular air-bubbles scattered through the interstitial tissue, which are easily distinguished from the minute shining air-bubbles, crowded together in regular arrangement, which are seen in lungs which have been inflated.—Bouchut, *Jour. f. Kinderkrankheiten*, 1863, 3–4, p. 263.

In most cases, the foramen ovale and the ductus arteriosus are found to be still open, or the latter has but partially closed.

The *causes* of congenital atelectasis have not been satisfactorily ascertained. The conditions that are probably the most frequent causes are: original debility of the infant, from any cause that has interfered with its proper development in utero, as feeble health on the part of the mother during pregnancy, or multiple pregnancy; and acquired debility, brought about by the fact of the infant's being exposed at birth to unfavorable hygienic influences, and particularly to those which interfere with the proper performance of the respiratory act, as cold, a vitiated and close atmosphere, and the use of too heavy or tight clothing. A very hurried and rapid labor has been thought to cause, in some instances, this imperfect expansion of the lung-substance. In a case that occurred to one of us (see *Am. Jour. Med. Sc.*, Jan., 1852, p. 83), the only explanation of the condition, which seemed at all plausible, was that the placenta had been separated from the uterus at too early a period of the labor, in consequence of the violent and rapid character of the latter, so that the child was for a short time before birth cut off entirely from its connection with the mother,—a time sufficient so to lower its vital forces, as to bring on a condition resembling syncope, and to deprive it of the muscular strength necessary on entering the world, to produce a full expansion of the thoracic cavity, and so of course to effect a dilatation of all parts of the lungs.

In addition to this, congenital collapse of the lungs may result from the air-passages of the child becoming obstructed with mucus or fluid in consequence of the umbilical cord being ruptured during labor, and an inspiration thus becoming necessary, before the head is free from the liquor amnii or the secretions of the mother's passages. Finally the want of expansion has been in some cases found to be dependent on pressure upon the medulla oblongata, implicating the roots of the pneumogastric nerves, resulting from inflammatory exudation or from effusion of blood owing to injuries incurred during delivery.

SYMPTOMS.—The symptoms depending on congenital atelectasis vary a good deal in different cases. There are some, however, which exist in most instances. These are the following: the child comes into the world feeble and weak, and instead of crying vigorously and loudly the moment or very soon after it is born, it fails to cry at all, or the cry is low and weak, or it is whimpering or wailing; the color, instead of being brick-red or dark-red, is pale and whitish, leaden, or livid; the muscular movements, which, in healthy children, are strong and vigorous, are in these, languid and slow, or there are none or scarcely any, the limbs being relaxed and motionless. If the breathing is observed, it is found to be short, high, and imperfect, and it is evident that the thorax is but imperfectly dilated at each movement of respiration. When these symptoms exist in a very marked degree, the infant either dies soon in a state of asphyxia, or, the muscular force slowly increasing, the respiration gradually improves, and the child is, after a longer or shorter time, either out of danger, or it falls into the same state as that of one in whom the symptoms have been from the first less severe. Under the latter circumstances, the infant continues feeble and weak. It breathes shortly, rapidly, and imperfectly, but often without any appearance of effort. The cry is rare, and when heard, is low and feeble, or there is with each respiration a constant plaintive moan, which is very characteristic, and strongly expressive of exhaustion. The color continues pale and whitish, or it is bluish, and the temperature of the extremities is lower than natural. The child sleeps the greater part of the time, and is unable to nurse or nurses very feebly, but can swallow when fluid is poured into the mouth. In such cases as these, the infant does not necessarily die, but will often recover when properly treated. In favorable cases, the symptoms just enumerated may last from a few hours to a day or two, or even a few weeks, without much change; then, under the influence of correct hygienic and medical treatment, they will often begin to improve. The color becomes less pale or less bluish; the muscular movements are somewhat stronger; the child begins to cry, and in a louder tone; the act of swallowing is easier and more perfect, or the infant is able to suck when applied to the breast, at first feebly and only for a moment, and then more strongly; the respiration becomes slower, fuller, and more natural, and gradually the dangerous symptoms disappear.

In unfavorable cases, on the contrary, the respiration fails to improve, but becomes more and more short, quick, and imperfect; the temperature of the body falls; the color of the surface changes, becoming leaden, bluish, or even livid, the change showing itself first in the neighborhood of the mouth, and in the hands and feet, and extending gradually to the rest of the body; the difficulty in swallowing becomes greater, and very generally some spasmodic twitchings begin to show themselves about the muscles of the face. The respiration is very often attended with slight wheezing or rattling, and the convulsive movements returning frequently, and becoming more violent and more general, the child dies in convulsions, or it sinks very slowly and gradually, without convulsions, as though in a state of syncope. According to Steffen (*Klinik. d. Kinderkr.*, 1865, 1 Bd., p. 50), thrombosis of the cerebral sinuses has been found after death under such conditions.

There is another symptom of imperfect expansion of the lungs in new-born and very young infants, which ought not to be passed unnoticed. It is one mentioned by Dr. George A. Rees of London, in an essay on this subject (London, 1850), and is of much diagnostic value, although not a pathognomonic symptom of this condition as regarded by him. It is an altered movement of the ribs in respiration. During the inspiratory effort the ribs are seen to move inwards toward the mesial line of the trunk, instead of outwards as in ordinary respiration, thus diminishing instead of expanding the transverse diameter of the thorax. The explanation of the altered movement is as follows: when the diaphragm descends, the lung ought to expand in such a way as to fill up the increased space produced in the thoracic cavity by the descent of that great muscle. Instead of this being the case, however, the lung is collapsed and inexpansive, and cannot enlarge sufficiently to fill up the space alluded to, so that there would remain a vacuum in the chest were it not that the thoracic walls are driven inwards by the pressure of the atmosphere upon their outer surface. In a case that we saw ourselves in a child fourteen months old, who had presented symptoms of atelectasis from birth, and in whom we found after death very extensive collapse, this symptom was very marked. The base of the thorax was indented on both sides by a deep gutter or depression, which remained depressed and unchanged during the inspiratory movements, or which, indeed, rather became more distinctly visible during those motions, so that the chest presented the curious spectacle of dilatation or expansion in its upper parts, during inhalation, and of contraction or collapse at its base.

In regard to this interesting sign the reader is referred to our article on rickets, where is mentioned the explanation given of it by Jenner, in connection with the latter disease.

Symptoms of Collapse in the Early Weeks of Life.—Before taking up the regular consideration of post-natal collapse, as it occurs at all ages of childhood, we wish to refer, for a moment, to that condition as it appears in the first few weeks of life, in infants who have exhibited no sign of it whatever, perhaps, at the moment of birth. We desire to do this now, because the symptoms to which it gives rise resemble much more those of congenital atelectasis, than those of collapse in children over a few months old. And let it be remarked that these symptoms are very different, and much more severe and threatening than those of collapse at later periods. They are in fact those of cyanosis, and, in some instances, are as strongly marked as those observed in the worst cases of that condition, caused by malformation of the heart or great vessels. The cyanosis and other symptoms of disordered circulation, evidently depend on the obstacle offered by the collapsed and condensed portions of lung-tissue to the discharge of blood from the right side of the heart. Though this obstacle to the venous circulation is doubtless the chief cause of the symptoms in these cases, we cannot but think ourselves, that the great difference between the symptoms of congenital atelectasis, as well as of post-natal atelectasis occurring in the first few weeks of life, and the collapse of later periods, must be explained in part, at least, by the fact that the fœtal openings, the foramen ovale, and ductus arteriosus, and especially the former, are still patulous, or in such a condition that they may be reopened under pressure, and so allow a portion of the contents of the overloaded and congested right side of the heart to pass into the left auricle, thence into the left ventricle and aorta, and so to the whole body.

In this form of atelectasis, the child may have been born perfectly healthy, or only weaker than usual, or it may have had some difficulty in establishing the respiration, which, however, has afterwards been effected in the most complete manner. Some days, or even weeks after birth, from a cause disturbing the function of respiration, portions of the lung may collapse, and give rise to the different symptoms of that condition in the manner above described. The most important of these symptoms are difficulty of breathing, consisting either in an increased or diminished rate of that function, diminution of the muscular power, cyanotic hue of the skin, and slight or severe spasmodic phenomena. In a case that occurred to one of ourselves (see *Am. Journ. Med. Sc., loc. cit.*), a child who had exhibited at birth, and for five days after, every appearance of fine health, was observed on the sixth day to cry rather violently in the morning. At one o'clock in the day he began to moan, and appeared distressed; at two he ceased to moan, became bluish, and seemed to lose his breath. He was placed in a bath, in which the blueness passed off, but the breathing continued irregular and uneven. He soon became blue again, and breathed slowly and irregularly, but had no spasm. At about four o'clock another paroxysm occurred, in which the whole surface became first bluish, and then dark, while, at the same time, the trunk and limbs became stiff and rigid under the influence of tonic muscular spasm, and the respiration was slow and imperfect. After the attack had lasted for some moments, the blueness and spasmodic phenomena disappeared, but the child remained in a state of stupefaction. There were two slight paroxysms of convulsive stiffening between this and evening, and later in the evening there was still some blueness, with irregular and short respiration. During the night the breathing was short and uneven, and attended with moaning, but on the following day the symptoms had disappeared entirely, and there was no return.

In another case the symptoms of collapse did not appear until the twenty-fifth day after birth. The infant had been hearty and strong at birth, and had established its respiration fully and completely. Between the birth, however, and the time of the attack, circumstances connected with the lactation had caused the development of diarrhœa with thrush, which had debilitated the child a good deal. On the day of the attack, frequent sneezing, with stuffing of the head, and some cough, seemed to show the existence of catarrh, and, on the same day, the child was unfortunately exposed, owing to the accidental opening of one of the gas-burners, to the inhalation of some gas. Late in the evening, a slight whistling or stridulous sound was heard in the breathing, the skin became suddenly a little bluish, and a slight convulsion followed. During the night there were frequent and strong convulsive seizures, always preceded and followed by deep blueness of the mouth, hands, and feet, and it was noticed that the least disturbance, as lifting or nursing, or changing the position, always brought them on. The next morning the attacks continued, but with diminished violence, under the effects of treatment, and they ceased after the middle of the day. The color of the skin had now changed; it had become rosy red, instead of pale or blue, and the hands and feet, which had been cold, were now warm and natural. There was no return after this.

In a third case a female infant, who had been perfectly well at birth and up to the moment of this attack, was put suddenly into a bath by the nurse on the eighth day, directly after its waking from sleep. The child, who was not thoroughly waked up, seemed greatly terrified, and began to scream most violently. Instead of removing the infant from the water, the nurse persisted in holding it immersed for some minutes, when it became deeply blue, and partially convulsed; it frothed at the mouth and nose, seemed to be suffocating for breath, and appeared to be dying. These symptoms continued for three-quarters of an hour, when they gradually passed away, and it fell into a heavy sleep. When we saw the infant, soon after this, the only signs of disorder that remained, consisted of an unusual paleness, drowsiness, and an expression of feebleness. Some three hours later, it waked, nursed, and from that time seemed quite well.

In a fourth case, a child born apparently well, with the exception of its having had a rather frequent respiration, and who nursed very well on the second and third day, was attacked on the fourth day with blueness, moaning, short and panting respiration, and then with slight convulsive symptoms. It was unable to nurse, and though kept perfectly still, and fed from time to time with small quantities of milk and brandy, became gradually more deeply blue, had paroxysms of very slow respiration and circulation, with general convulsive seizures, and died at the end of twenty-four hours.

The reader will also find this form of cyanosis referred to in our article on that disease.

DIAGNOSIS.—There can be no difficulty in detecting the nature of the case when the imperfect expansion exists from birth, and when the physician is present at that event.

When, however, collapse of the lung-tissue continues after birth, and the physician is called upon to determine, at the age of some days, weeks, or even months, the cause of the feeble health and puny growth of the child, or to explain those sudden attacks of collapse in very young infants who had previously well established, to all appearances, the respiration, the diagnosis becomes more difficult. In the former class of cases, attention to the following points will usually, however, enable us to make a correct diagnosis. The previous history is particularly important, since, in all such cases, it will be found that the infant was either still-born and resuscitated with more or less difficulty, or that it was born weak and feeble, and that the respiration had not been established as thoroughly and completely as it ought to have been. Dr. Rees states that certainly half of the cases of this form, in his own practice, occurred in twins, and that they were all born in a more or less completely asphyxiated condition. The present symptoms are also very important. The feeble appearance of the child, and its puny growth, in connection with its past history, and the absence, as ascertained by careful examination of the case, of other morbid conditions to explain the general ill-health, ought to direct the attention of the physician to the true nature of the disease; and if we add to these considerations the local thoracic symptoms, the short, rapid and imperfect breathing, with, perhaps, the altered movement of the ribs, the indentation instead of expansion during inspiration, mentioned above; the absence of fever; and the existence of the physical signs of more or less extensive solidification of the pulmonary tissue, without those of pneumonia; there will seldom be any difficulty in forming a correct diagnosis.

The cases described under the head of collapse in the early weeks of life may be readily understood from the simple fact that the symptoms cannot be satisfactorily explained by referring them to any other condition than that of collapse of portions of the lung, with impeded and deranged circulation.

PROGNOSIS.—The condition of imperfect expansion of the lungs in a new-born child, does not necessarily cause it to die immediately or very soon after birth. The fate of the child will depend very much upon the cause of the atelectasis, upon its degree of innate strength and vigor, and upon the kind of hygienic conditions to which it may be consigned. When the child is well developed, and not enfeebled by any fault in the mother's health during the pregnancy, but merely by some momentary condition that has occurred during the labor, there is every reason to hope that proper hygienic and medical treatment may restore it to health. The danger is greatest in those who continue weak and feeble, in spite of the proper measures of care and treatment, for some days or weeks after birth. We have a record of ten examples of this condition in new-born children, in nine of which the symptoms persisted during a period varying between six hours and five days. Of these, seven lived, while three died in from twenty-one hours to three days.

The prognosis of the second class of cases—those in which collapse occurs suddenly a few days or weeks after birth, and after the apparently complete establishment of respiration—will vary, of course, with the violence of the symptoms. Of five cases of this kind that came under our observation, recovery took place in three in spite of the most dangerous and alarming symptoms, while in two death occurred in a period of about twenty-four hours.

In cases where the collapse of the lungs has been extensive, and has in part persisted without proving fatal, serious organic changes in the heart have been found to follow, both by F. Weber and Steffen. The long-continued obstruction to the pulmonary circulation prevents the closure of the ductus arteriosus, and subsequently causes hypertrophy with dilatation of the right side of the heart, a patulous state of the foramen ovale, and at last eccentric hypertrophy of the left auricle and ventricle. Undoubtedly, in most cases, death occurs before these changes in the heart are induced, but it is important to be aware that imperfect expansion of the lungs may thus serve to develop serious cardiac disease of a form likely to be attended with cyanosis.

When the imperfect expansion depends upon the presence of accumulations of mucus in the air-passages, well-directed efforts usually succeed in effecting the removal of the obstruction, and the establishment of free inspiration. In those cases, finally, where there is pressure upon the pneumogastric nerves near their origin, a fatal result must always follow.

Treatment.—The treatment of congenital atelectasis must be directed to the removal of its probable cause. If this is suspected to be obstruction of the air-passages by collections of mucus, the infant's mouth should be cleansed, and vomiting provoked by tickling the fauces. In addition to this, all the measures calculated to stimulate respiration should be employed.

When the imperfect expansion appears to depend merely on the weakness of the infant, the treatment resolves itself almost entirely into the employment of such means as tend to invigorate the general health of the child, and to promote the activity of the respiratory act. In a recent case, one dating from birth, in which the function has always been imperfect, and in which there are present great feebleness, drowsiness, and paleness or blueness, the room in which the infant is placed should be kept up to a temperature of 70° or 75°, and the child should be abundantly covered with warm clothing. Perfect quiet, or at least very gentle motion, is very important, and when there is any disposition to deep blueness or to convulsive movements, attention to this point is essential. It is in such cases, and in those in which these symptoms come on a few days or weeks after birth, that the position recommended by the late Dr. C. D. Meigs, for the treatment of cyanosis neonatorum, was found by him so useful. This position is one upon the right side, with the head and shoulders raised at an angle of 45°. It is obtained by arranging pillows in such a way as to form a plane inclined at that angle. Upon this the infant is placed, and orders are given that it is not to be moved at all, if possible, or only with the greatest care and gentleness, for twenty-four or forty-eight hours. There can be no doubt that this position and the attendant repose have, in many cases recorded by Dr. C. D. Meigs, and in several that we have seen ourselves, been of very great use in controlling the symptoms. Its good effects in cyanosis were supposed by him to depend on the fact that the septum auricularum becomes horizontal in this position of the body, so that the blood in the right auricle must rise against gravity, in order to pass through the foramen ovale, while, at the same time, the valve of that opening is disposed to fall down by its own weight, and close the foramen, and is, moreover, pressed downwards by any blood that may enter the left auricle from the pulmonary veins. This explanation will apply, of course, only to those cases of atelectasis accompanied by very extensive and deep blueness or purple color of the surface, in which we may suppose that so much of the pulmonary tissue is solidified, as to produce a degree of obstruction to the passage of blood from the right side of the heart into the lungs, sufficient to overload the right ventricle and auricle, until the latter pours a portion of its contents into the left auricle, thus causing admixture of the two kinds of blood. In a large majority of the cases of atelectasis, however, this explanation of the benefit resulting from the treatment referred to, cannot be received, as there is no reason to suppose that in them the slight cyanotic symptoms present indicate anything more than the existence of a moderate degree of congestion of the right side of the heart, unattended by any escape of blood from the right into the left auricle. In such cases the position on the right side is useful, because it is the one most favorable to a full and easy performance of the respiratory and circulatory functions. It leaves the left side free and unembarrassed, so that the heart can act with the greatest possible freedom, while the partial elevation of the head and shoulders renders the movements of the chest more easy and complete than when the body is lying on a horizontal surface. The perfect quiescence which constitutes a part of the treatment is also very important, as in many recent and particularly in cyanotic cases, the symptoms are greatly aggravated, and convulsive attacks often brought on by moving the child, especially if this be done suddenly or rudely.

Various means are also recommended for rousing the force of respiration, as by compelling the infant to cry, by frictions of the surface, by plunging the body alternately into warm and cool water, or by allowing a stream of cold water to fall on the nape of the neck with the view of exciting the respiratory nerve-centres.

Attempts may also be made to produce full inflation by gentle mouth-to-mouth respiration. The other modes of attempting to accomplish this are either (as by compressing the thorax at regular intervals) of but little value, or (as in case of Hüter's proposal to inflate the lungs after catheterization of the larynx) highly objectionable.

Perhaps the most important point of all in the treatment of this affection, especially when the symptoms tend to become persistent, is the mode of nutrition of the child. If possible, the infant should always have a good breast of milk, and if unable to suck, the milk ought to be drawn by means of a breast-pump, and given to the child in small quantities from a spoon. About two or three teaspoonfuls may be given at first every half hour or hour, and the quantity gradually increased until the child gains strength enough to be put to breast. If breast-milk cannot be procured, cow's milk and water may be substituted, in the proportion of one part of the former to two or three of the latter. The only medicines to be given are, at first, while the child is still very young and weak, mild stimulants, of which the best, in our opinion, is fine old brandy. Of this about five drops may be given each time that the milk is taken; or, we may make use of from three to five drop doses of the aromatic spirit of hartshorn, or of proper quantities of wine-whey.

When the symptoms of congenital atelectasis tend to persist for several weeks or months, or when we first see the patient some time after birth, the chief points to be attended to in the treatment are, as before, the mode of nutrition, which ought to be by nursing and the use of gentle stimulants and tonics. Brandy, wine, or Huxham's tincture of bark, are the best stimulants; whilst quinine, in the dose of a quarter or half a grain, three times a day; extract of cinchona, in the dose of from one to three or four grains, three times a day; or iron in the form of Quevenne's powder, or in that of the iodide, are the best tonics.

Vogel (*Dis. of Children*, Amer. ed., 1870, p. 55) speaks very highly of the advantage derived from the cautious application of electricity to the pectoral muscles.

COLLAPSE OF THE LUNG, OR POST-NATAL ATELECTASIS.

GENERAL REMARKS.—By collapse of the lung is meant the return of that organ to its fœtal or unexpanded state. It is in fact a condition of atelectasis or imperfect expansion of its vesicular structure. The terms collapse or post-natal atelectasis are employed to contradistinguish it from congenital atelectasis, the former being applied to imperfect expansion as it occurs in lung-tissue after previous expansion, and the latter, as stated in the preceding article, to the same condition as it exists in children who have never expanded certain portions of the pulmonary substance.

The true nature of collapse of the lung was never understood, and its great practical importance never appreciated, until since the year 1844, when MM. Legendre and Bailly published, in the *Archives Générales de Médecine*, their researches on the subject. Since then various observers have repeated the investigations of those gentlemen, and thrown new light upon the matter. Among the most important of the later writers on this subject, we may mention Dr. Charles West of ondon, MM. Hardy and Behier of Paris, Dr. W. T. Gairdner of Edinburgh, and MM. Rilliet and Barthez, in the second edition of their work.

This discovery in pathology was one of very great value, not merely because it renders our knowledge of the morbid conditions of the lungs more exact and philosophical than it ever was previously, but because it explains certain anatomical changes in the pulmonary structures, often before noticed and described, but never satisfactorily accounted for; and still more, because it points to methods of treatment much more rational and much more successful than those employed under the influence of former ideas as to the nature of the lesions alluded to. The most important result of the new views is the disclosure of the fact that several lesions met with after death, which were formerly thought to depend on inflammation of the affected tissue, are in reality the consequences of collapse or obliteration of the vesicular structure of the lung, and not of inflammation, as was at one time supposed. The lesions alluded to are those which have been hitherto described under the names of lobular pneumonia and carnification.

The peculiar character of the lesions met with in many of the supposed cases of pneumonia, had often attracted attention and been commented upon, before their real nature came to be understood. The points of difference between these alterations and those of true pneumonia were particularly noticed by MM. Denis, De La Berge, Rufz, Rilliet and Barthez, Dr. Gerhard, and Dr. West. In fact, M. Rufz, and MM. Rilliet and Barthez, both approached very near the truth in regard to these lesions, each comparing them, but the former at an earlier period than the latter, to the condition of the lung of a fœtus that has never breathed. The latter writers, in the article on pneumonia in their first edition, have described a condition of the lung which differed so much from ordinary pneumonia as to create a great difficulty in their minds as to its true nature, and to it they applied the term carnification. They were on the very verge of detecting its real character; they did in fact suggest its real character, but were so possessed with the idea that it must be the result of some inflammatory action as to neglect to pursue their own suggestion, but endeavored to explain the condition on the ground that it was "one mode of termination of pneumonia, or else chronic pneumonia." The following passage, quoted from their work (1ère ed., t. i, p. 74), will show how closely they approached the truth: "The first idea that enters the mind on examining this tissue (carnification) is, that it resembles the lung of a fœtus that has not breathed; we should feel inclined to say that the pulmonary vesicles had not yet been dilated under the influence of the thoracic expansion, and had not, therefore, admitted air into their interior; or, rather, it would seem as though they had been obliterated by some attack of disease, perhaps inflammation, without, however, remaining engorged, and after having lost the power of dilatation."

In the second edition of their great work, MM. Rilliet and Barthez adopt, in great measure, the views of MM. Legendre and Bailly, and of Dr. Gairdner, not only in regard to carnification, but also in regard to the yet more important lesion hitherto generally called lobular pneumonia.

But it is not only the condition of the lung called carnification that has been shown to consist, not in inflammation, but in a collapse of the pulmonary tissue. A much more important consequence of the recent researches has been the discovery that in a very large majority of cases the so-called lobular pneumonia, generalized lobular pneumonia, and pseudo-lobar pneumonia of different writers, are also the results of collapse of the lung, variously combined with bronchitic inflammation and congestion of the pulmonary tissue. The latter discovery has lessened very much the importance of pneumonia as a disease of early life, while it has augmented in the same proportion that of bronchitis, for it has shown that a very large number of cases, formerly regarded as true inflammation of the parenchyma of the lung, are in fact cases of bronchitis combined with collapse of the tissue of the organ.

Now that the nature of collapse of the lung, in connection with bronchitis, and sometimes, also, with true pneumonic inflammation or congestion, has been made known, a number of symptoms occurring in the pulmonary affections of children, which formerly seemed obscure and irregular, have become easily explicable. It had been often observed that many of the supposed pneumonias of children did not present the same symptoms, pursue the same course, nor require the same treatment as the pneumonia of adults, or as some cases of the disease in children. In a great many of the supposed cases there was an unusually large amount of bronchial inflammation, the general symptoms were much less acute than was to be expected in a parenchymatous inflammation, and what was most singular of all, the physical signs of solidification of the lungs were very variable and uncertain, there being present on one day the signs of simple bronchitis, while on the same day or the following, and over the same region of the thorax, these would be associated with or masked by the signs of induration of the lung; and again, in a day or two, the symptoms indicative of condensation might disappear, to be succeeded yet again by those of simple bronchial inflammation. The effects of treatment seemed also to point clearly to a radical difference between the lobular or broncho-pneumonia of children, and the acute phlegmasial disease of adults. It was found, in fact, that depletory measures were seldom borne well in the lobular pneumonia of children, while in the pneumonia of the adult, and in some acute cases occurring in early life, which presented the same general symptoms and the same physical signs as pneumonia in the adult, antiphlogistics, as is well known, are amongst the most successful remedies that can be made use of.

ANATOMICAL LESIONS.—Collapse of the lung (post-natal) occurs in two different forms, the *diffused*, and the limited or *lobular*. The only difference between the two forms is in the number of lobules affected, and their mode of distribution. In the diffused variety, a large number of adjoining lobules collapse, and give a condensed and solid appearance to larger or smaller portions of the lung, most frequently to the edges merely of one of the lobes, but at others to the greater part or the whole of a lobe, or even the major part of a lung. In the lobular variety, on the contrary, single lobules or clusters of lobules become collapsed in different parts of a lobe or lung, and the affected portions take the form of irregular hardened patches or tumors, situated upon the surface, or disseminated through the interior of the pulmonary texture. In the former kind of collapse, the appearance of the altered portion of the lung is somewhat that of lobar pneumonia, and it is to these cases that the terms generalized lobular, pseudo-lobar, carnification, and splenization, have been applied; while in the latter kind, the isolated and distinct condensed portions have been described by the term lobular pneumonia.

The peculiar or fundamental characters of collapsed pulmonary tissue are the same in both varieties. We will mention them as succinctly as possible, and then compare them with those of pneumonia, for the reason that it is with the lesions of that disease that those of collapse have been so frequently confounded.

Collapsed lung is generally of a dark violet color, but it may be much darker in tint, and even black, when it is much engorged with blood. Its consistence is always changed; the condensation may amount merely to slight hardening, with a diminution of the crepitation, or it may be very dense with an entire absence of crepitation, in which case portions thrown into water sink rapidly. Though more or less hardened, the tissue still retains a certain degree of flaccidity and suppleness. When cut into, the surface is seen to be smooth and uniform, having somewhat the appearance of muscle, and presenting no granulations. Pressure or scraping cause the exudation of more or less semi-transparent bloody serosity. Close examination shows that the organic elements of the tissue, the vessels, bronchia, cellular tissue, &c., can still be distinctly traced. Lastly, inflation of the lung distends the condensed parts, and gives to them again, more or less completely, their natural physiological characters.

MM. Rilliet and Barthez, in their second edition, treat, at considerable length, of congestion of the lung as a very constant accompaniment, and as a very important element in the state of collapse. They regard this congestion as being connected nearly always with bronchitic inflammation, and as being not merely a passive state, but as exhibiting phenomena, in most instances, which prove it to be in some degree an active condition. They say (*op. cit.*, t. i, p. 428): "We readily acknowledge that a state of debility, prolonged dorsal decubitus, and the obstruction to the circulation thus occasioned, facilitate the production of this condition, and give to it the appearance of a simple passive congestion. But we believe that there exists, moreover (frequently, if not always), a really active and even inflammatory movement." They regard this opinion as proved chiefly by the fact that they have found the texture of the affected parts to be somewhat softened, as shown by the facility with which they are torn by the finger or by scraping with a scalpel; by the swelled and turgid condition the tissues exhibit; by

the quantity of sanguineous or sero-sanguineous liquid which escap
on pressure; and by the presence of a serous exudation around th
pulmonary vesicles, while the interior of the vesicles appears to b
healthy. The last-mentioned condition they found upon their own o
servation, and upon a microscopic examination made by M. Lebert.

The color is different in the two alterations; being, in collapse, purpl
or livid, and, in pneumonia, brownish-red or fallow-red. In pneumoni
the pleura covering the hepatized portions is often covered with fals
membrane, showing thereby the inflammatory nature of the disease
in collapse this is rarely the case, and only when there is some acci
dental concomitant pneumonia. The density of the lung in the tw
conditions is of a different kind: in pneumonia it is hard to the touch
and unyielding; in collapse it always retains a certain degree of flac
cidity and softness, like that of muscular tissue. In pneumonia th
diseased part is turgid and swelled, so that it projects above the com
mon level of the surrounding surface; in collapse, on the contrary, it i
shrunken and depressed below the neighboring parts. In pneumoni
the effect of the inflammatory process on the tissues is very strongl
marked, and produces changes in them very different from those occa
sioned by mere collapse. In the former disease the cohesive propertie
of the pulmonary structure are very much lessened, so that the inflame
parts are readily penetrated by the finger, and are easily torn; in simpl
collapse, on the contrary, the diseased part is as firm and resisting, o
even more so, than in health; whilst in collapse occurring in bronchiti
and attended with congestion, though the cohesion of the tissues i
somewhat lessened, it is never nearly so much so as in pneumonia. I
the true hepatization of pneumonia, a cut surface always presents
granular aspect, while in collapse, on the contrary, it is smooth an
even. On scraping a cut surface it is found that, in the former altera
tion, a plastic, fibrinous matter, of a yellowish, orange, or gray color
comes off on the knife; while, in collapse, only some semi-transparen
bloody serosity is scraped off. In the former, the anatomical arrange
ment of the lobules cannot be seen, as the inflammation attacks indif
ferently the lobules themselves, the interlobular septa, and parts o
neighboring lobules; but, in the latter, the alteration can always b
seen to be more or less regularly confined to the lobules, the cellula
interstices between the lobules remaining more or less apparent; s
that in pneumonia the alteration is not bounded at all by the outline
of the lobules, while in collapse the alteration always affects, more o
less, the lobular form. To conclude, the effects of inflation are altogethe
different in the two conditions. M. Legendre (*Recherches Anatom.-Path
et Clin. sur quelques Mal de l'Enfance*, p. 164) states that air can neve
be made to penetrate by inflation into a completely hepatized lung
Neither in hepatization of the lobar form, nor in true partial hepatiza
tion, has he ever been able, even with the utmost effort, to push ai
into the inflamed tissues. After repeated trials, the tissue remaine
compact and friable, and sank as rapidly as before when thrown int
water. In the fœtal state, on the contrary, the slightest effort suffice

to fill and distend the collapsed air-cells, and to give to the altered portion its natural appearance, excepting that it became more red in consequence of the oxygenation of blood contained in the capillaries. Dr. Gairdner (*Pathol. Anat. of Bronchitis, &c.*, Edinburgh, 1850, pp. 13, 14) remarks that, though this test "is very useful in demonstrating the nature of the lesion, in a favorable case, to one not familiar with its character, I do not believe it to be applicable to the determination of the presence or absence of pneumonia in those mixed cases in which alone there is any difficulty." He has observed, in fact, that partially pneumonic lung may be inflated when the affection is recent and combined, as it frequently is, with bronchitic collapse, while in the latter lesion, in its purest forms, complete inflation is often very difficult or impossible after the collapsed state has been of some duration.

The part of the lung in which collapse is most frequently met with, depends somewhat on the form of the alteration. In the diffused variety, it may affect a more or less considerable portion of either or both lungs, but is most common at their posterior part. The lobular variety is most common on the anterior edges, but may, like the diffused, occur in any other part. As a general rule, the alteration is most frequent at the periphery of the organ, where its edges are thin, as along the margins of the lobes, in the languette of the upper lobes, and at the bases of both lungs. The parts just named are those most distant from the primary air-passages; they are those in which the inspired air would arrive last, and with the least force of impulsion.

CAUSES.—It has been generally acknowledged that there are two principal causes by which to explain the production of collapse of the lung. These are the presence in the bronchia of some condition which acts as an impediment to the ready passage of the inspired air, and a want of power in the muscular apparatus by which the function of respiration is carried on. To these Dr. Gairdner adds another,—the inability to cough and expectorate, and thus remove the obstructing mucus,—but this is, in fact, included in the preceding.

The most important of the above-mentioned causes is evidently the deficient respiratory power, since this is noticed and insisted upon by all observers. It has been found, in fact, that collapse seldom occurs to any considerable extent except in children who are exhausted and debilitated. The debility may be congenital, it may be the result of wearing diseases, as diarrhœa, hooping-cough, measles, typhoid fever, &c., or it may depend on exposure to unwholesome and enfeebling hygienic conditions. It is easy to understand that a child who is either born weak and feeble, or who becomes so in after years from any of the causes just alluded to, must lose, with the general decay of the strength of the body, some portion of the muscular power by which alone a complete and efficient dilatation of the thoracic cavity can be accomplished, and that, when this is the case, the inspirations must be short and imperfect, and that portions of the lung most distant from the primary air-passages, not being reached by the inspired air, will remain in an unexpanded or collapsed state. If we add to this state of feeble respiratory power, the presence of opposing secretions in the air-tubes, whether these be the consequence of bronchial inflammation, as they are in the immense majority of cases, or, as Dr. Gairdner suggests they may sometimes be, the mere natural secretion of these tubes, accumulated for the want of power to throw them off, it becomes abundantly easy to comprehend the mode of production of collapse, in at least some of the examples.

Whether a simple deficiency of inspiratory force alone, without obstructing mucus in the bronchia, will give rise to collapse, is a somewhat mooted point. Dr. West agrees with MM. Legendre and Bailly, in the opinion that it is often due to the inspiratory power having been inadequate to overcome that natural elasticity of the lung which opposes a full dilatation of the organ. Dr. Gairdner (*loc. cit.*, p. 33) cannot "see reason to believe with Dr. West, that mere debility, apart from any obstruction in the tubes, is a sufficient cause for collapse in the child." He remarks, and with strong show of reason, that the very fact of the lesion being usually more or less lobular, or partial in its distribution, appears to indicate special circumstances of a local kind, as having a marked influence on the production of this affection. What is of most consequence, however, to the working physician, as an important practical truth, is the fact stated by several observers, and adverted to by Dr. Gairdner himself, that in some cases no signs whatever of obstructive bronchitis or of bronchial accumulation can be discovered during life. Before leaving this point, we desire to call attention to the opinion of Hasse (*Pathol. Anat.*, Syd. Soc. ed., p. 253), that, though this partial introduction of air might be deemed at variance with the laws of respiration, inasmuch as the atmospheric pressure must necessarily distend the entire lung equally, not to the exclusion of a lobe, and still less to that of a lobule, the objection falls to the ground when it is considered that the operation of these laws is the result of previous muscular action. He refers to the fact that in pleurisy one-half of the thorax, and in partial pleurisy certain portions of that cavity, do not share at all in the movements of the remainder. "We need, therefore," he says, "be at no loss to understand how defective breathing may originate in a merely partial activity of the intercostal or other respiratory muscles."

Dr. Gairdner, as already stated, considers as one of the causes of collapse, an inability to cough and expectorate, and thus to remove the obstructing mucus. The views which he expresses on this point are very interesting, and also, we think, very important. He states that Laennec supposed the expiratory force of respiration to be weaker than the inspiratory, while in fact the experiments of Hutchinson and Mendelsohn, to which he refers, prove that though *ordinary* inspiration is more of a muscular act than *ordinary* expiration, yet the residual effective force for overcoming adventitious obstruction is very considerably greater in expiration. "The *forced* or *muscular* expiratory act is, in fact, about one-third more powerful, as measured by its effect upon a pressure-gauge, than the extreme force of inspiration; and it is this force which is thrown into action when obstruction in the tubes is to be overcome." In the act of coughing, the air in the vesicles is brought to bear upon the obstructing substance within the bronchia, at a maximum amount of outward pressure, and with the additional mechanical advantage of a sudden impulse, so that the practical efficiency of the expiration in forcing air through obstructions must be far greater than that of inspiration. It is clear, therefore, that if the secretions in the air-passages be so abundant or so viscid as to interfere materially with the entrance and exit of air, they must necessarily occasion collapse, either partial or total, of the parts beyond them, since not only does the air enter with difficulty, but being expelled with greater force and in larger quantity than it can be drawn in, the amount remaining in the vesicular structure must gradually diminish. This effect of obstruction will be still more remarkable when the muscular force of respiration is diminished by debility of the patient, for then the inability of the inspiratory act to replace the air driven out by expiration, will be yet more marked than when the muscular powers of the body retain their full force.

There is still another mechanical condition which tends to produce collapse from obstruction, to which Dr. Gairdner refers. This condition is to be found in the form of the bronchial tubes. These tubes are a series of gradually diminishing cylinders, and if a plug of any kind, but especially one closely adapted to the shape of the cylinders, and possessing considerable tenacity, be lodged in any portion of such a cylinder, it will move with much more difficulty towards the smaller end, and in doing so will close up the tapering tube much more tightly against the passage of air, than when moved in the opposite direction into a wider space. From this arrangement of the parts, it will happen that at every expiration a portion of air will be expelled, which, in inspiration, is not restored, owing in part to the comparative weakness of the inspiratory force, and in part to the valvular action of the plug. "If cough supervene, the plug may be entirely dislodged from its position, or expectorated, the air, of course, returning freely into the obstructed part; but if the expiratory force is only sufficient slightly to displace the plug, so as to allow of the outward passage of air, the inspiration will again bring it back to its former position, and the repetition of this process must, after a time, end in perfect collapse of the portion of lung usually fed with air by the obstructed bronchus."

We have been thus particular in our consideration of the causes of collapse, because we are convinced, from personal observation, that it is a subject of very great importance in practice. Many times, in the last few years, we have met with cases of bronchitis, either primary or secondary, in weak and debilitated children, in which the general and local symptoms have pointed clearly to the existence of collapse of the lung, and in which, moreover, the good effects of a sustaining and even stimulating treatment have shown the great utility of an acquaintance with the nature of this affection, and its proper remedies.

SYMPTOMS.—As collapse of the lung occurs almost always in connection with bronchitis, though sometimes, alſo, after, or concomitantly with pneumonia, it is clear that the symptoms which reveal its existence must be mingled, in a greater or less degree, with those of the two diseases just named. It is true, nevertheless, that it sometimes occurs unassociated with more than very slight evidences of any other disease of the lung. Cases of the latter kind have been usually observed only in children dying in states of utter exhaustion, in whom the muscular power of respiration has been so greatly weakened, as to prevent a dilatation of the thoracic cavity sufficient to carry air into the deeper parts of the lung. In such instances, the symptoms of collapse do not show themselves until a very short time before death, and they consist in the sudden appearance of very rapid and oppressed breathing, with little or no cough, in more or less extensive dulness on percussion over different parts of the chest, but most frequently the inferior dorsal regions, and in feeble or suppressed respiratory murmur, or more frequently a distant and imperfect bronchial respiration. In some cases, however, in which there is very little bronchial complication, as shown by the rarity and small amount of the catarrhal râles, the symptoms of collapse continue with more or less irregularity, as to situation and extent, for periods of several weeks, or even months. But here, also, as in the cases previously referred to, the general debility and low health of the child are strongly marked, and are, with slight variations, persistent. As an instance of this kind of collapse, we may cite the following case, which occurred in the practice of one of ourselves:

A boy, between three and four months old, who, at birth, and up to the time of this attack, had presented every appearance of strong and vigorous health, was seized, on the 3d of October, 1849, with symptoms of a somewhat irregular and anomalous character, but which we soon suspected to be the signs of an intermittent fever. We were induced in part to make this diagnosis, from the fact of having attended the mother during her gestation of this child, in a severe attack of intermittent fever. At the beginning of the sickness, there was some little coryza, but no cough whatever. On the 3d of October, after the coryza had lasted for a few days, he became worse, and we were sent for. During the six days following this, he had one or two attacks each day of coldness of the extremities, followed by violent fever, and ending sometimes with perspiration. He was exceedingly fretful, screamed a great deal, was at times drowsy and dull, and vomited occasionally. The stools were regular and perfectly natural. The breathing was rapid and short nearly all the time, but there was no cough whatever. On the seventh day, the respiration was 100 by the watch, and irregular. The child was pale, weak, drowsy, and entirely without cough. Percussion revealed nothing, and no râles could be heard. On the eighth day, the breathing was 96, and a slight, dry cough was heard two or three times. When roused up, the intelligence of the child seemed perfect. On the ninth day, the breathing was 63, and the pulse 120. There was rather more cough, though still very little, and there was a slight return of the coryza, of which there had been none for several days before. Neither auscultation nor percussion revealed any decided change in the lungs. On the eleventh day, the paroxysms of chilliness, followed by fever, were still noticeable, though there was no clearly marked periodicity in the returns. When without fever the breathing was 54; during the fever it was 67. Auscultation revealed nothing decided. Percussion showed dulness beneath the right clavicle. By the seventeenth day, the intermittent nature of the disorder was more decidedly marked, and under a few doses of quinine the symptoms had improved, so that the breathing fell to 30 during sleep. The cough was a little more frequent, though still very slight, and it was loose. The coryza, also, was more considerable, the nasal discharge being quite abundant.

After this the case went on badly, owing, we think, in great measure, to the circumstance of the quinine being abandoned in consequence of the opposition made by the parents to its administration,—an opposition which we allowed to influence us more than was proper. During November and December, the child remained weak, pale, languid, and with uncertain appetite, sometimes refusing the breast for a whole day at a time. The quinine was suspended at first on account of the great improvement which had taken place in the symptoms, and though resumed afterwards, was given in such small quantities, and for so short a time, for the reasons just mentioned, as to be of no service. In December the child was very ill. It looked badly, having a pale, waxy face, and a dull, languid expression, though without any want of intelligence; it emaciated moderately, and had occasional vomiting; the stools were natural. At this time also it took the mother's breast with some difficulty, and refused artificial food altogether. Occasionally during this month there was observed a slight blueness around the mouth, and also about the hands and feet. Late in the month it was attacked with thrush in a slight degree, which lasted several days. In the first week of January, finding that it was fast sinking from refusing the mother's breast and artificial food, a wet-nurse was procured, and for a few days it seemed to improve a little, but this did not last. It grew weaker and thinner, the thrush returned, it had now a good deal of loose cough, the abdomen became somewhat contracted and felt hard and doughy, and the breathing was very rapid, though not greatly oppressed. The child died at last on the 26th of January, having, for ten days before that event, looked wretchedly languid and haggard, and having presented for three days before, slight diarrhœa, loose, frequent cough, entire lose of appetite, thrush, drowsiness, and, finally, coma.

At the autopsy there were found some fibrinous exudation, and a few adhesions over the lower half of the left lung. The lower two-thirds of the left and the lower half of the right lung were dark-colored, more dense than usual, not friable, and exhibited no granulations on a cut surface. These portions were in fact collapsed. The upper lobes were spongy, crepitant, and healthy. Not a tubercle was found. The foramen ovale presented an oval-shaped opening, of the size of a goose-quill. The abdominal organs were healthy.

When, as indeed most usually happens, collapse occurs in the course of bronchitis, it is associated of course with the symptoms of that disease. The bronchitic symptoms have lasted in their usual form for several days, having been marked by sonorous, sibilant, and subcrepitant râles, when suddenly, or in the space of a few hours, the breathing becomes much worse, the pulse rises in frequency but becomes small and feeble, and certain changes take place in the physical signs which are very important. The subcrepitant râle continues to be heard, but it is associated now with prolonged expiration, and a little later with bronchial respiration, which, however, is of a different kind from the bronchial respiration of pneumonia, being distant and smothered, instead of near and metallic, as in that disease. The percussion becomes, at the same time, dull and obscure, but never, scarcely, to the same extent as in pneumonia. The general symptoms are those of exhaustion, rather than of high reaction. The surface is pale or slightly bluish, the skin is either natural in temperature, slightly warmer than usual, or coolish, the strength is very much reduced, and the child appears more seriously ill, and particularly more oppressed than the amount of bronchitis present would seem to explain.

As an example of collapse occurring in the course of bronchitis, we will give the following case. A girl between two and three months old, healthy when born and up to the time of this sickness, saving that she was rather paler and smaller than most robust infants, was seized with coryza and slight cough, and after a few days with the symptoms of a mild bronchitis. For two days there was frequent cough, some little fever, quick but not oppressed breathing, occasional sibilant and mucous râle, perfect ability to nurse, and very moderate restlessness or fretfulness. On the third day, without any apparent reason, the symptoms became suddenly very alarming. The breathing became extremely rapid and most violently oppressed, so that the movements of the chest at each respiration were heaving and laborious, the shoulders being lifted high at each respiration, the outer angles of the mouth drawn downwards, and the alæ nasi widely dilated. There were at the same time abundant subcrepitant, intermingled with dry râles over the dorsum of the chest. In this case, moreover, the symptom mentioned by Dr. Rees was very well marked. The base of the chest was driven inwards at each inspiration, producing at that point an evident constriction, whilst the upper parts were lifted high in the effort to carry on the respiration. The cough was frequent and racking, and occurred in paroxysms. The child was still and quiet, pale, had a haggard and exhausted look, was unable to nurse at all, and its surface was cool and white, especially that of the extremities. These symptoms continued with very little modification for twenty-four hours, when, under the use of brandy administered every hour in milk drawn from the mother, of the spirit of Mindererus and paregoric, perfect quiet, and the assiduous employment of mild revellents, they began to moderate, and at the end of another twenty-four hours the constriction at the base of the thorax during inspiration had disappeared, the breathing was easy and gentle, the extremities had become warm, the child nursed eagerly and abundantly, and, with the exception of a slight catarrh, which lasted a few days longer, it was well.

Collapse depending on bronchitic inflammation, in debilitated children, may sometimes last a considerable length of time. In one case, indeed, that we saw a few years since, and of which an account was published (see *Am. Journ. Med. Sci.* for January, 1852, p. 98), the symptoms, owing probably to the fact that the bronchitis causing the collapse was an accompaniment of hooping-cough, continued with slight variations in degree for a period of about three months, after which the child entirely recovered.

Diagnosis.—The diagnosis of collapse of the lung must always be more or less uncertain where it is of the lobular form, for the reason that the collapsed lobules being disseminated irregularly through the pulmonary tissue, afford no physical sign by which we can detect their condition. The presence of this form ought, however, to be suspected whenever, in a chronic disease, and especially in the course of a catarrhal attack occurring in a feeble and debilitated child, the breathing becomes excessively quick and labored, the skin pale and coolish, when the base of the thorax presents a depression instead of an expansion during inspiration, and, especially, when these symptoms occur without there being a sufficiently severe and extensive bronchitis to explain their existence.

In cases of collapse affecting a considerable or the greater part of a lobe, the diagnosis, though still perhaps rather uncertain, is much more clear and positive than in the lobular form. In the latter form we are obliged to depend, indeed, almost exclusively upon the rational symptoms, the physical signs being either very slight or entirely null. In collapse of considerable portions of the lung-tissue, we have, on the contrary, some very useful physical signs. These are, the existence of dulness, greater or less, on percussion; feeble respiratory murmur; prolonged expiratory sound, and sometimes bronchial respiration; which, when they occur in connection with, and in the course of bronchitis, are usually quite sufficient to render the diagnosis easy.

The only diseases with which collapse of the lung, presenting the physical signs just mentioned, could be confounded, are pneumonia and pleurisy. From both of these it is usually distinguishable by the absence in collapse, or the slight severity, of the reactional symptoms, by the paleness or blueness and coolness of the surface, by the absence of acute pain, by the greater severity in collapse of the bronchitic symptoms, and by the fact that it rarely occurs except in enfeebled, broken-down subjects, or in those laboring under severe bronchitis. The character of the physical signs, moreover, is different. Though we have dulness on percussion in collapse, it is not so absolute as that either of pleurisy with large effusion, or that of confirmed pneumonia. The bronchial respiration, too, is in collapse different from that of pneumonia. It is muffled and distant, instead of being clear, metallic, and close under the ear, as in pneumonia: and is heard, too, much more in the expiration than in inspiration. In collapse there is also heard, unlike either pneumonia or pleurisy, an abundant subcrepitant râle. To add to these differences, it is proper to say that, in cases of pneumonia and pleurisy, the course of the disease is much more regular, and the special symptoms so well marked as to leave no doubt as to the real nature of the attack.

Prognosis.—The prognosis of collapse must depend, in great measure, on two circumstances—the amount of bronchitis which accompanies it, and the constitutional state of the child. When it occurs during the course of extensive bronchitis, as shown by a great abundance and extent of the bronchitic râles, it must add greatly to the danger of that disease; and if, at the same time, the child be weak and debilitated, either from causes long previously in action, or from the severity of the present attack, the risk to life is very great indeed. Collapse is dangerous, also, but far from necessarily fatal, in subjects in whom its chief cause has been simple debility. The possibility and the probability of recovery will depend on the hygienic conditions to which the child is exposed, the degree of vital strength it is likely to inherit from its parents, the extent of the collapse, as indicated by the severity of the thoracic symptoms, both rational and physical, and the effects of treatment. When the subject can be placed under favorable hygienic conditions, when it has inherited from its parents a good and vigorous hold on life, and when the symptoms of collapse are not very violent, a proper and rational treatment will in all probability save it, while, under opposite circumstances, the chance of recovery would be very small, if there were any.

Treatment.—The treatment of collapse, or post-natal atelectasis, must vary somewhat in different cases. One general rule will apply, however, to all; that is, to employ a sustaining and strengthening system of medication, to the exclusion of all exhausting means.

In cases which are entirely, or almost entirely, independent of bronchitis, the most important measures to be attended to are the regulation of the temperature in which the child is kept, of the clothing, and of the diet, the use of mild stimulants and of tonics, and the external employment of revellents. The child ought to be kept in a warm, even temperature of from 70° to 75°; it should be clothed in soft flannels, and its diet ought to be nourishing and strengthening. If at the breast, we should be sure that the milk is of a good quality, and that the nurse has an abundant flow. If weaned recently, it ought to have, if possible, a wet-nurse, and so also if it be supposed that the mother has too little milk, or that this is not perfectly healthy. If permanently weaned, the diet should be so arranged as to give to the child what is at the same time easy of digestion and nutritious. In a severe case, coming on suddenly, the most suitable internal remedies are brandy, in small doses, frequently repeated, Huxham's tincture of bark, the spiritus Mindereri or the aromatic spirit of hartshorn, and small doses of quinine or extract of cinchona. In slower and more chronic cases, we must depend on a well-selected and nutritious diet (and food ought to be given almost by force, or at least it should be urged strongly on the ild), on warm clothing, and on the use internally of brandy, quinine, he citrate of iron and quinine, pure metallic iron, the iodide of iron, Huxham's tincture of bark, or some such remedy. In sudden cases, the best revellents are the following: mustard weakened by admixture of flour or Indian meal, and applied once in three or four hours; a plaster made of suet or simple cerate grated over with nutmeg; or liniments composed of ammonia, spirit of turpentine, or oil of amber, mixed with sweet oil. In chronic cases, the Burgundy pitch, or compound Galbanum plaster, made somewhat weaker than those used for adults, should be applied over the front and back of the chest, or we may rub the thorax twice a day with any ordinary ammonia liniment, made, if necessary, rather more irritating than usual by the addition of some oil of monarda. The daily use of a gentle emetic of ipecacuanha has been recommended, and supposed to prove useful, by emptying the bronchia of their secretions, and also by the fact that its operation induces several deep inspirations, and in that mode promotes the better performance of the respiratory act. We have never employed the emetic except in cases accompanied with a good deal of bronchitis and consequent accumulation of mucus in the air-tubes, and not then when the prostration was very great. In fact, the operation of any emetic is sometimes productive of so much exhaustion of the strength, as to cause us to hesitate in prescribing a remedy of that class; though we can fully understand that the act of vomiting, if not followed by too much prostration, could scarcely fail to prove beneficial in collapse, by the strong efforts at breathing which it gives rise to, and also by the succussions it must impart to the lungs through the medium of the diaphragm.

In cases of collapse occurring in the course of, or towards the termination of severe bronchitis, the treatment must resemble a good deal that which we have just described as proper for the same condition, when it exists unassociated, or associated only to a slight extent, with that disease. When the symptoms of imperfect expansion appear towards the termination of, or after the patient has partially recovered from bronchitis, and when of course the strength is more or less reduced by the severity of the previous acute sickness, and also perhaps by the necessary measures of treatment, the case ought to be managed very much in the same way as has just been recommended for those in which the collapse was caused chiefly by exhaustion, and less by the presence of obstructing secretions in the bronchia. Nourishing, but very light and digestible food; mild stimulants, as small quantities of brandy or wine-whey; the bitter tinctures, iron, or quinine, with counter-irritants to the surface of the chest, warm clothing, and repose, constitute the necessary and most reasonable remedies. When, on the contrary, the atelectasial condition supervenes in the midst of extensive and severe bronchitis, we are called upon to treat at the same moment two morbid states, one consisting of active inflammation, and another of want of power in the muscles of respiration to force the atmospheric air through the secretions which are obstructing the air-passages. Under these circumstances, there is almost always associated with the bronchitis, as we shall find when we come to treat of that disease, more or less intense congestion of the collapsed portions of the lungs. We must employ, therefore, such remedies as tend to modify the inflammation of the bronchial mucous membrane, and diminish thereby the amount of secretion poured into the air-passages; such as may serve to expel mechanically those secretions; and those which shall unload the congested lung of its excess of blood, always taking care, in our selection of the agents to accomplish these ends, to choose those which are the least perturbative and exhausting. To moderate the inflammation of the bronchial mucous membrane, and with a view also to unload the congested parts of the lung, we may apply a few dry cups, or rely on counter-irritation, the best mode of effecting which is by the repeated application of mustard poultices, consisting of one-third mustard to two-thirds Indian meal or flour, and by mustard foot-baths. These poultices ought to be applied first to the dorsum and then to the front of the chest, once in every three or four hours, and they should be made large enough to cover a considerable portion of the thoracic walls. Counter-irritation, assiduously made use of, is, we believe, one of the most, if not the most effectual means of treatment in the case. Emetics ought to be given twice a day, or even three times, if they do not reduce the strength too much. The best are those which operate with the least subsequent prostration, such as ipecacuanha or alum. When they are found to exhaust much, and to increase thereby the labor of breathing, their use must be suspended.

After emetics, or when these cannot be used, the remedies from which we have obtained the greatest benefit are the liq. ammon. acetat., and seneka, either in decoction or syrup, combined sometimes with small quantities of opium. To a child two years old we should give twenty drops of the acetate of ammonia solution, with ten of the syrup of seneka, or with a teaspoonful of decoction of seneka, every two hours. When the cough is paroxysmal, painful, and harassing, about ten drops of paregoric, half a drop or a drop of laudanum, or from four to six drops of solution of morphia, may be added to each of the above doses. The opiate ought to be continued until the cough and restlessness diminish, and then be suspended. In all these cases, there should be no hesitation in giving small quantities of brandy or wine-whey, whenever the symptoms of prostration are so marked as to indicate danger; and these stimuli are urgently called for when the pulse is very rapid and small, when the skin is cool or pale and bluish, and when the general aspect of the patient, and the convulsive and labored character of the breathing, show that the muscular strength of the child is scarcely sufficient to carry on the function of respiration.

ARTICLE II.

PNEUMONIA.

DEFINITION; SYNONYMS; FREQUENCY; FORMS.—The term pneumonia is now, by universal consent, applied only to inflammation of the parenchymatous structure of the lungs. It is often called, in this country, catarrh-fever, lung-fever, or inflammation of the lungs.

It is one of the most frequent, and, therefore, one of the most important of the acute diseases of childhood. Dr. West, in a paper on the pneumonia of children (*Brit. and For. Med. Rev.*, April, 1843), informs us that the English tables of mortality show pneumonia to be the cause of a larger number of deaths in childhood than any other disease, with the exception of the exanthemata. From the third report of the Registrar-General, he quotes the facts that of all the deaths in the metropolitan districts under fifteen years of age, 13.6 per cent. were from pneumonia, 13.0 per cent. from convulsions, and 5.4 per cent. from hydrocephalus. He obtained nearly similar results from an examination of the returns from Manchester, Liverpool, and Birmingham.

In this city it appears from the bills of mortality that the deaths from this disease are strikingly below the percentage calculated by Dr. West. Thus, during the seven years ending with 1869, the total mortality from all causes (excluding still-born children) was, at all ages, 105,785; under fifteen years of age, 50,151; and under five years, 43,322. The total mortality from pneumonia during the same period was, at all ages, 5567, or 5.26 per cent. of the entire mortality; under fifteen years, 2985, or 5.95 per cent. of the mortality under that age; and under five years, 2746, or 6.33 per cent. of the mortality under that age. During the same series of years, the total mortality from bronchitis was, at all ages, 969, or less than 1 per cent. of the entire mortality; under the age of fifteen years, 509, or 1.01 per cent. of the mortality under that age; and under the age of five years, 495, or 1.14 per cent. of the mortality during the first five years of life.

Any one who will study with attention the various doctrines in regard to pneumonia and bronchitis that have been set forth in the different works on the diseases of children, will most assuredly acknowledge that there are few diseases about which there has prevailed so much diversity of opinion as to the real nature of the lesions forming the essential anatomical characters of the disorder, and, as a consequence of this, so much doubt as to the proper mode of classifying and describing them. From the time of the appearance of the works of M. Valleix, M. Barrier, Dr. Gerhard, and especially that of MM. Rilliet and Barthez, up to the moment of publication of the essay of MM. Legendre and Bailly (referred to in the article on atelectasis), it was commonly believed that inflammation of the parenchyma of the lung exhibited in children very different characters in the majority of th cases, from those which marked the pneumonia of the adult. Tw principal forms of the disease were therefore described by most writers —the *lobular* and the *lobar*. The former was supposed to be almos peculiar to children, and to occur only on rare occasions in adults; th latter was held to resemble, in almost every respect, the pulmonic inflammation of the adult. Moreover, lobular pneumonia was generally believed to be by far the most common form assumed by the inflammation in children under five years of age, whilst lobar pneumonia was thought to be comparatively rare under the age mentioned. Besides these two chief varieties of pneumonia, two others have been described under the names of *vesicular* and *marginal* pneumonia, while to yet another MM. Rilliet and Barthez applied the title of *carnification*.

The researches of MM. Legendre and Bailly have caused a great revolution in the views of a large number of medical observers and writers. These authors first pointed out (as stated in the article on atelectasis) that a very large proportion of the cases previously described under the titles of lobular pneumonia, generalized lobular pneumonia, pseudo-lobar pneumonia, marginal pneumonia, and the carnification of MM. Rilliet and Barthez, were in fact cases of bronchitis variously associated with congestion and collapse of the tissue of the lung. They themselves described these supposed different forms of pneumonia under the title of *catarrhal pneumonia*. But, though they were opposed to the opinion of lobular pneumonia being a true inflammation of the lung, they did not assert that children were not subject like adults, to regular inflammation of the pulmonary parenchyma They described, in fact, as nearly all others have done, a *lobar* pneumonia, which exhibits the same anatomical characters, and very nearl the same train of symptoms, both rational and physical, as the pneumonia of adult life; and a *partial* pneumonia, in which the inflammation, instead of invading a large part of a lobe or a whole lobe, attack isolated small portions of the parenchyma, so as to present an appearance of nodules of inflammation scattered here and there through th healthy tissue.

Since the publication, in 1844, of the views arrived at by MM. Legendre and Bailly, numerous other observers have repeated and continued their researches, but with very different results. Some hav adopted their opinions entirely, others in part, while a few still adher tenaciously to the old doctrines. Amongst those who now believe tha lobular pneumonia in its different forms is in fact bronchitis with collapse of the lung-tissue, and not inflammation of the pulmonary parenchyma, the most important are Drs. West and W. T. Gairdner (*loc. cit.* MM. Hardy and Behier (*Pathol. Int.*, t. ii, p. 529, *et seq.*), MM. Rillie and Barthez, in their second edition, and Dr. Fuchs (*Brit. and Fo Med.-Chirurg. Rev.*, July, 1850, p. 154, *et seq.*). Amongst those who oppose the new views, we may mention the names of M. Bouchut an those of the authors of the *Compendium de Médecine Pratique*. W would refer any one who desires to study this matter as treated b

English hands to the essay *On the Pathological Anatomy of Bronchitis and the Diseases of the Lung connected with Bronchial Obstruction*, by Dr. W. T. Gairdner, of Edinburgh. It is decidedly the best English work on the subject we have seen, for it treats not only of atelectasis in children, but contains yet more numerous observations upon the same condition as it occurs in adults. The second edition of MM. Rilliet and Barthez is also very full on this subject, those authors adopting in great measure, as above stated, the views of MM. Legendre and Bailly.

Our own opportunities for investigating this interesting subject by post-mortem examination have been comparatively few, so that we have been obliged to form our conclusions in regard to it chiefly from a study of the researches of others, and from a comparison of the symptoms which we have observed during life in the different pulmonary affections of children, with those researches and with the results we have obtained from the few autopsies that we have been able to make. Assisted by these combined means of forming a conclusion upon the subject, we have been led to the belief that the former method of dividing the pneumonia of children into the two forms of lobular and lobar is incorrect, and we have determined to substitute for the term lobular that of *partial*, which is the one employed by M. Legendre and also by Dr. Alois Bednar (*Die Krankheiten der Neugebornen und Säuglinge*, Dritter Theil, Wien, 1852, p. 65), while we shall describe the other form of the disease under its usual title of *lobar*. Of these two forms, the latter is much the most frequent, though it was formerly thought that the lobular was more common than the lobar variety, simply from the fact that bronchitis attended with lobular collapse (the condition heretofore almost always described as lobular pneumonia) is much oftener met with in children than true pneumonia, either lobar or partial.

PREDISPOSING CAUSES.—It is generally believed that pneumonia is most apt to occur in the course of other affections. This is certainly true in regard to the disease as it prevails in hospitals, and probably amongst the poorer classes of society also. MM. Rilliet and Barthez state that of two hundred and forty-five cases observed by themselves, only fifty-eight, or a little less than a fourth, occurred in children previously in good health. The proportion of secondary cases is much smaller in private practice, since of fifty-one cases of well-marked pneumonia, observed by ourselves, in which this point was noted, only six were secondary. No doubt one cause of this apparent discrepancy between the authors mentioned above and ourselves, is the fact that we have left out of consideration all the cases in which the pneumonic symptoms were not entirely clear, thus putting aside a number of cases which they would have classed as lobular pneumonia, but which we prefer to regard as examples of bronchitis with collapse. *Age* forms a strong predisposing influence. Of the two hundred and forty-five cases above quoted, one hundred and seventy-two occurred under five years of age. Dr. West (*loc. cit.*) says that during the first five years of life, the cases of pneumonia were in the proportion of 10.3 per cent. to the total of diseases, while in the succeeding five years they were in the proportion only of 1.3 per cent. The mortality bills of this city exhibit the same marked excess in the proportion of deaths from pneumonia under five years of age, as compared with the ensuing years. We have already seen that the proportion during the first five years of life is 6.33 per cent. of the entire mortality under that age; while during the ensuing ten years the deaths from pneumonia form but 3½ per cent. of the total mortality during that period of life. These statements do not agree with our own experience in private practice, since of fifty-five cases that we have seen in which this point was noted, twenty-eight occurred under five, and twenty-six between five and eleven years of age, showing that the frequency in the first five and the subsequent six years of life is very nearly the same. True pneumonia is less frequent in private practice in the first two, than in the succeeding years of life.

Sex.—A larger number of cases occur in boys than girls. The excess is probably not more, however, than may be accounted for by the preponderance of male over female children. Of fifty-five cases in which we have noted the sex, thirty occurred in boys, and twenty-five in girls.

Constitution.—It is doubtful whether constitution has much or any influence upon the liability to the disease. Dr. West says that weak health is not a predisposing cause, according to his experience. We are convinced that it attacks strong and vigorous children more frequently than those of more delicate constitution. In children of feeble health and weak stamina, the very same causes which produce pneumonia in the robust, give rise to bronchitis.

Season.—The disease is most prevalent during the winter and early spring months, as will be seen from the accompanying table, in which is shown the mean monthly mortality in Philadelphia, for the seven years ending 1870, from this disease, as well as from bronchitis. From this it will be seen that in December, January, February, and March (and the same is very nearly true of April also), the deaths from these diseases are three times as numerous as in August.

Months.	Mean monthly mortality for 7 years, from Pneumonia and Bronchitis.		Mean total mortality from all causes (including still-born) for 7 years.	Mean monthly percentage for 7 years, from Pneumonia and Bronchitis.	Mean monthly temperature (F.) for 7 years.
January, . .	Pneumonia, . Bronchitis, .	46 6.29	1296.71	3.54 0.48	30.87°
February, .	Pneumonia, . Bronchitis, .	45.57 8.43	1206.71	3.76 0.69	33.89°
March, . . .	Pneumonia, . Bronchitis, .	48 57 7.14	1344.29	3.61 0.53	40.85°
April, . . .	Pneumonia, . Bronchitis, .	41.57 5.71	1281.14	3.24 0.44	52.27°
May, ...	Pneumonia, . Bronchitis, .	34.76 6.57	1234.29	2.81 0.53	62.77°
June, ...	Pneumonia, . Bronchitis, .	26.14 5.00	1178 14	2.21 0.42	71.97°
July, ...	Pneumonia, . Bronchitis, .	24 14 4.00	1837.00	1 31 0.21	77.71°
August, . .	Pneumonia, . Bronchitis, .	20.14 3.00	1825.43	1.10 0.16	76.62°

Months.	Mean monthly mortality for 7 years, from Pneumonia and Bronchitis.		Mean total mortality from all causes (including still-born) for 7 years.	Mean monthly percentage for 7 years, from Pneumonia and Bronchitis.	Mean monthly temperature (F.) for 7 years.
September, .	Pneumonia, . Bronchitis, .	14.57 5.29	1215.43	1.19 0.43	68.31°
October, . .	Pneumonia, . Bronchitis, .	22.43 5.43	1218.14	1.84 0.44	56.30°
November,	Pneumonia, . Bronchitis, .	28.86 5.71	1052.14	2.74 0 54	46.68°
December, .	Pneumonia, . Bronchitis, .	39.57 8.14	1191.00	3 32 0.58	34.74°

We have also placed in parallel columns the mean percentage of mortality from these two diseases, and the mean monthly temperatures, in order to show the marked correspondence between the coldness of the weather and the frequency of pneumonia and bronchitis. It is evident, however, that there is another element, beside the mere temperature, in determining their frequency, since, in both February and March, more deaths occurred from these causes than in January, although this latter is the coldest month of the year. The additional element is undoubtedly to be found partly in the sudden atmospheric changes, and damp, raw days which are so frequent, in both February and March, in our latitude, and partly in the impaired vitality found in many children, as the result of the intense cold of the preceding months.

Previous Diseases.—It is apt to occur as a complication of all the diseases of children, and most frequently in measles, pertussis, typhoid fever, enteritis, and bilious remittent fever.

Exciting Causes.—The continued action of some of the predisposing causes must be regarded as the exciting cause in the majority of the cases. External violence, as a severe fall, or a blow upon the chest, will sometimes act as an exciting cause. The action of *cold* is almost always alleged to be the immediate cause of the attack. M. Grisolle states that it is impossible to determine the exciting cause in more than a fourth of the cases, and that in nearly all of these it is cold.

Anatomical Lesions.—*Lobar* pneumonia in the child is marked by the same physical characters as in the adult. The three stages of the inflammation—engorgement, red hepatization, and gray hepatization—exhibit the same alterations of the tissues as in adult life. Moreover, the three stages occur with about the same frequency in early as in later life. Dr. West (*loc. cit.*, 2d ed., p. 189) shows that the third stage occurs very nearly as often in children as in adults, he having met with it in the former in the proportion of sixty-eight per cent., while M. Grisolle found it in seventy-two per cent. of the latter. The chief difference in the disease, as it exists at the two ages, consists in the more frequent coexistence of all three of the stages in the young subject.

In the first stage, or that of engorgement, the affected portion of lung is distended, so that it does not collapse in the same proportion as the healthy portions, when the thorax is opened. It is heavier than usual, so that it sinks somewhat in water; it is of a brownish-red color;

it pits upon pressure, and crepitates less than healthy lung, the crepitation being observable only here and there. The natural degree of cohesion between the tissues is somewhat diminished, so that the diseased portion is much less tough and elastic, and more soft and friable than it ought to be. When cut into, a large quantity of frothy, and more or less deeply-tinged sanguineous fluid escapes.

In the second stage, or that of red hepatization, the lung is increased in volume, so that it continues to fill the side of the chest after that cavity is opened; it is dense and hard, has ceased entirely to crepitate, from the fact of having become completely impermeable to air, and sinks rapidly when thrown into water. Externally, the diseased portion is of a deep-red color, while internally the same color is observed, but often of such different shades as to give to a cut surface a marbled aspect. The cohesion between the tissues is, in this stage, much less strong than in health or in the first stage of the disease; the finger penetrates the lung with some ease, and the texture can be crushed between the finger and thumb. When cut into, there escapes a non-aerated and reddish fluid, which is much less abundant than in the first stage. The most important feature of red hepatization is, however, the granular character of an incised surface. This granular appearance is produced by the presence of numerous minute flat granular elevations, which are the air-vesicles distended with the plastic lymph which has been exuded within them. It is best seen by examining a torn surface of the lung.

In the third stage, or that of gray hepatization, the lung continues to exhibit the same volume, density, impermeability to air, and consequent total absence of crepitation, as in the second; but the process of softening has made still further progress, so that a portion of the lung may be squeezed with the greatest ease between the finger and thumb into a pulp. The color has now changed from deep-red to a dirty light-gray, or a pale straw-yellow. When incised, the surface still presents a granular appearance, but the granules are more irregular and flatter. The diseased portions are now infiltrated with a puruloid fluid, which escapes in considerable quantities in the form of a yellowish-gray liquid, whenever the lung is cut into.

The anatomical lesions, which characterize *partial pneumonia*, occur under two conditions. In one the alterations are exactly the same as those of the lobar form, the only difference between the two being that, in the partial form, the hepatization affects distinct patches of the pulmonary substance, producing, therefore, hard nodules of hepatization scattered through healthy tissue. These nodules are irregular in form, and imperfectly circumscribed, but present, like the lobar form, the three stages of the inflammation—engorgement, red hepatization, and gray hepatization. The second variety of partial pneumonia is characterized by patches of hepatization, varying in number from fifteen to thirty, and in size from that of a hemp-seed to that of a pigeon's egg which are more or less spherical in shape, hard to the touch, and exactly limited. M. Legendre states that these hepatized points becom transformed into a grayish, rough, and uneven substance, of a fibrous appearance; a change which takes place at different points of the diseased mass, sometimes in the centre only, sometimes in their whole extent, and at others on their circumference.

Abscesses are not very uncommon in the pneumonia of children. They occur as a result of the third stage of the disease, so that in the same lung may be observed the first, second, and third stages of the inflammation, and abscesses. The cavities of the abscesses are generally circular, sometimes oval, and they measure from half a line to an inch or more in diameter. Sometimes the abscess is multilocular, each of the purulent cavities being partially separated from its neighbor by a wall of hepatized tissue. They are found in various parts of the lung, but seem disposed, generally, to approach the surface of the organ. When the latter event happens, adhesive inflammation between the pulmonary and costal pleura usually takes place; but should this fail to occur, the abscess may rupture into the pleural sac, and produce pneumothorax. MM. Rilliet and Barthez met with two examples in their autopsies in which this accident had occurred, and they report another case in which it occurred during life, and in which the child recovered. We have met with three cases of pneumothorax ourselves, produced in the same way. One occurred in a boy eleven years old, during an attack of secondary pneumonia complicating a severe bilious remittent fever. The patient recovered entirely after a most violent illness. The two others occurred in very young children, and proved fatal.

We are desirous, before closing our remarks on the anatomical lesions of the disease under consideration, of drawing attention to the subject of simple non-inflammatory congestion of the lung, for the reason that the latter has no doubt, especially when associated with collapse of the pulmonary tissue, been frequently mistaken for pneumonia.

Congestion of the lung occurs either in the lobular or lobar form, the distinction between the two being the same as that between lobular and diffused or lobar collapse. When lobular, the lung presents, generally along the posterior edge of the organ, disseminated lobules, distinctly circumscribed by the interlobular cellular septa, which are rather protuberant than depressed, more friable, and of a lighter purple color than collapsed lobules, and which afford, when squeezed, a considerable quantity of frothless bloody fluid. In very young infants, the congestive disposition often assumes the lobar or diffused form, and is supposed by M. Legendre to have frequently been taken for pneumonia. In this variety of congestion, the affected portion of the lung is increased in size, and is distended and gorged with fluids. The color of the congested part varies from a light to a dark purple, or almost blackish tint. The cohesion of the lung is also variable, the differences depending on the degree of the congestion. When this latter is very great, the part is very friable, while it is much less so under the opposite condition of things. Though the lung is harder in this state than natural, it still retains a certain degree of flaccidity which does not exist in true hepatization. Pressure causes an abundant exudation of blood and serosity from a cut surface, and the latter, instead of being granulated, as is always the case in hepatization, is smooth and even. Neither does the lung exhibit any granulations when it is torn. Lastly, inflation distends all the vesicles, and gives to the condensed parts their natural lightness and their rosy color, though, be it remarked, the development of the affected parts under the operation is not complete and entire, as in collapse, in consequence, no doubt, of the large amount of blood they contain.

Inflation of the lung after death has been much employed of late, as any one who has read the previous remarks on atelectasis must have seen, as a means of distinguishing between pneumonia and collapse. It was there stated that, whilst inflation distended, and restored more or less completely to their natural condition, parts of the lung that were merely collapsed, it failed almost entirely to have any effect on parts of the lung affected with true pneumonia. It is easy to understand why inflation should fail to exert much effect on inflamed lung, at least when the disease has reached the state of hepatization. In fact, the tissues comprising the lung are glued together and hardened by a deposit of plastic lymph, poured out chiefly on the inside of the air-cells, so that it becomes impossible to force the air into the midst of the agglutinated structures. In the first stage of pneumonia, that of congestion, inflation will distend in some degree the affected portions, but, in the second and third stages, not even the strongest force has any effect on the impermeable vesicles.

Lobar pneumonia is stated by most authorities to be generally confined to one lung, and such has been our own experience in regard to it, since of 56 cases in which its location was carefully determined, it was unilateral in 52, and double only in 4. It is much more common on the right than left side, according to most writers. In the 52 cases just referred to, the distribution was nearly equal, the disease being seated 29 times on the right side, and 23 times on the left. It attacks the lower lobe much more frequently than the upper, though pneumonia of the upper lobe is much more frequently met with in children than in adults. Of 51 cases in which this point was determined, the upper lobe was the part affected in 20, while in 31 the base of the lung was the seat of the disease. Of the 20 cases of inflammation of the upper lobe, in 13 it was seated on the right, and in 7 on the left side. Of 31 cases occurring in the lower lobes, 15 were on the right, and 16 on the left side. In the 4 cases of double pneumonia, the inflammation attacked the lower lobes of both lungs in one; in one the postero-inferior part of both upper lobes was especially involved; while in the two others it attacked first the base of the left lung, and afterwards the summit of the right.

The statements just made as to the seat of the pneumonic inflammation in the cases that have come under our own observation, do not, we are well aware, agree exactly with the experience of other observers. Dr. West, for instance, found (*loc. cit.*, p. 190) that double pneumonias preponderated greatly, in early life, over those wherein only one lung ffered. This, it will be observed, is widely different from the result f our experience, and it is also directly opposed to that of MM. Rilliet and Barthez, Rufz, and Barrier. M. Barrier, in fact, cites (*Mal. de L'Enfance*, t. i, p. 286) 144 cases of lobar pneumonia as having been observed by the authors just mentioned, and by himself, and of these only 15 were double. Our results in regard to the frequency of double lobar pneumonia agree, therefore, with those of the authors last mentioned, but they differ as to the relative frequency with which the two lungs are attacked. Thus, in our cases, the inflammation occurred with nearly equal frequency in the two lungs, whilst of 129 cases of unilateral pneumonia observed by the above authors, 84 were seated in the right, and 45 in the left lung. These writers state, as most others do, that pneumonia of the lower lobe is more common than that of the upper lobe. This tallies with our observations, but, as it seems to be a general opinion in the profession, that inflammation of the summit of the lung is rare in comparison with that of the base, we wish to call attention again to the fact stated above, that of 51 cases, in which we ascertained accurately the seat of the disease, it was in the upper lobe in 20, and in the lower in 31.

It was formerly supposed that *bronchitis* was an exceedingly frequent accompaniment of pneumonia, and there is no doubt that such is really the fact in a much larger proportion of the cases that occur in children, than of those that occur in adults. But, since the discovery of the nature of the anatomical alteration which we have described under the title of collapse or atelectasis, it has become clearly evident that one reason why it was thought that bronchitis so generally accompanied the pneumonia of children, has been that a large number of cases, heretofore classed as pneumonia, were in reality cases of bronchitis attended with collapse. It has been shown, indeed, in the preceding pages, that there is good reason to believe that a very large majority of the cases hitherto described as lobular pneumonia, ought to be classed under the head of bronchitis. Now, these cases are precisely those in which bronchitis has been found to occur so constantly, and to form so large a portion of the disease; and they, moreover, have always been stated to be of much greater frequency than cases of lobar pneumonia. If, however, we conclude to regard what was formerly called lobular pneumonia, as bronchitis with collapse, and to restrict the title of pneumonia to the cases in which there is a true hepatization of the lung, we shall have left only lobar pneumonia, which is not at all a rare affection, and partial pneumonia. Now, in the lobar pneumonia of children, as in that of adults, bronchitis does not usually exist to any very considerable extent, and we may state, therefore, that, though bronchitis exists to a greater or less extent in most of the pneumonic cases of children, it is in a much less severe degree than was at one time supposed.

When bronchitis is present it varies from simple increased vascularity with augmented mucous secretion, to intense congestion with purulent or pseudo-membranous secretion.

Pleurisy is a frequent complication, as it is found to exist in abou half the cases.

Emphysema is another common complication. It generally occupie the upper part of the lung, or its free edge, and is found most strongly developed in the lung which presents the greatest amount of inflammation, or in both, when both are inflamed. Its degree depends on the extent of the pulmonary inflammation and bronchitis, and the severity of the dyspnœa. The vesicular form is much more frequent than the interlobular.

SYMPTOMS; SKETCH OF THE DISEASE; COURSE.—In order to present a faithful account of the disease, a general sketch of the symptoms will first be given, after which the most important ones will be considered separately under the head of particular symptoms, so that the reader may first obtain a notion of the course of the disease, and then become intimately acquainted with its details and peculiarities by reference to the remarks on each particular symptom.

True pneumonia, with well-marked hepatization, is not, according to our experience, a common affection in young infants in private practice, since out of fifty cases of the disease that we have met with in children, in which we have noted this point, only two occurred in infants within the first, and three in the second year. Of the two cases within the year, one occurred in a child six weeks old, and the other in one seven months.

In *new-born children, and those still at the breast*, pneumonia very generally begins with more or less marked symptoms of bronchitis, though in some instances it commences suddenly, as it does in adults, without any previous sign whatever of bronchial inflammation. When it occurs during an attack of bronchitis, the symptoms which belong to the pneumonic inflammation will, of course, have been preceded by those which depend on the disease of the bronchial mucous membrane. In these cases, the development of the pneumonia will be indicated by an aggravation of the general symptoms, by an increase of the oppression, by the fact that the cough and breathing both become more painful than before, and by the occurrence of the physical signs peculiar to pneumonia, or, in other words, by the symptoms which depend upon and mark a state of inflammation of the parenchyma of the lung. Of thes we shall now give an account.

When pneumonia appears as a primary affection in young childre without preceding bronchitis, as sometimes undoubtedly happen though much less frequently than in children over five years of ag and especially than in adults, the attack is usually sudden. The fir symptoms observed are restlessness, peevishness, disposition to cry, diminished appetite for the breast, and feverishness. These symptom are most marked in the evening and night. From the very first, or b the second day at least, cough is heard, and careful examination of th breathing will show that it is somewhat hurried. The cough is dry short, and hacking, at first, and not very frequent, but it soon become louder, fuller, more straining, and especially it becomes painful. Th fact that it is painful may always be ascertained by watching the motions of the child, its cry, and the expression of the face. We can always perceive, even in an infant, a disposition to restrain the cough, to smother it, a struggle to make it short and sudden, when it causes sharp pain. At the moment of the cough, too, a marked expression of pain, a kind of sudden grimace or twisting of the features, may always be observed, which is accompanied or followed instantly by a loud, sharp cry, or a spell of crying. This grimace of pain, with the accompanying cry, we have never observed in their most characteristic form in simple bronchitis, but only in pneumonia and pleurisy. We have twice seen these symptoms so decidedly marked that they could not fail to have drawn any one's attention; once in an infant six weeks old, who died of a most violent and extensive pleuro-pneumonia, and again in a child thirteen months old, who died of pleurisy resulting in the formation of pure pus in the pleural sac. The nature and extent of the lesions were ascertained, in both cases, by examination after death. The presence of pain in the side is shown also by the fact that full inspirations, caused by changing the position of the child, and those which occur during fits of crying, occasion a sudden arrest or stoppage, so to speak, of the act of inhalation, which gives to the crying, and often also to the breathing, a sobbing character, while across the countenance passes at the same moment the expression of pain already referred to. The breathing, which is only slightly disturbed at first, soon becomes frequent and attended with more or less effort, and gives rise to an unusual play of the nostrils, a symptom which ought always to attract attention to the respiratory system as the seat of disorder. It interferes also with the act of nursing, so that whether the child takes the breast less frequently than usual, from want of appetite, or seeks it with greater avidity than common, from thirst, the act of sucking is attended with some difficulty. The infant seizes the breast for a few instants, then lets go in order to breathe more easily, and seizes it again; or it drops the nipple suddenly and begins to cry, as though the act of sucking were painful from the necessity it begets of taking occasionally a fuller and deeper inspiration than usual. As a general rule, the bowels are torpid, while vomiting, which is rather unusual in older children, is quite common in young infants.

When the disease is once established, whether it have been preceded by bronchitic symptoms, or occur as a primary affection, the symptoms are generally well marked, so as to leave but little difficulty in the recognition of the disorder. The child now loses all gayety and cheerfulness, and becomes either dull and listless, or very restless, peevish, and troublesome. Young infants generally lie quietly on the bed, or in the lap, merely fretting and crying when they cough, or when they are moved for any purpose, while children of several months old, and those in the second year, are usually very cross and restless, crying and screaming when anything is done for them, and insisting upon being frequently moved from the cradle or bed to the lap, or from the lap to the cradle. As a general rule they are contented only upon the lap, always crying to get back when they are removed from it to the cradle or crib. In some instances, however, they, like young infants, are quiet and dull, being content to lie still when placed in a comfortable position, and crying only after coughing, for the breast or drink, or when disturbed.

A febrile reaction now displays itself in full force. The skin becomes hot and dry, and the pulse frequent, rising to 150 and 160, or higher, in infants, and to 140 and 150, or even 160, in those of several months old. The temperature rises very quickly, so that by the close of the first twenty-four hours it may reach 104°, 105°, or even 105.8° (Roger). The dyspnœa becomes more and more evident. The respiration rises to 60, 70, 80, or even higher. In a case of pleuro-pneumonia at six weeks of age, we counted it at 128. The breathing is at the same time more or less labored and difficult, the alæ nasi being seen to dilate spasmodically at each inspiration, while the motions of the chest, and especially those of the abdomen, are much stronger and more active than in healthful respiration. The cough is now more frequent than before, evidently painful, and usually dry, though sometimes a slight degree of looseness may be detected in the sound which it occasions.

Percussion now reveals manifest dulness over the seat of disease, which is usually the base, though not at all unfrequently the upper region of one side. When the disease is double, which is oftener the case, as already stated, in children than in adults, though not so often as has been supposed by some, the percussion will be dull of course over the affected region on each side. Together with the dulness of sound on percussion, and sometimes when this is faintly marked, there is an evident diminution of the elasticity of the walls of the chest, and this becomes, therefore, an important symptom, especially when dulness on percussion is absent. The dulness on percussion is not, indeed, so marked a symptom in infants as in adults, from the fact that the natural resonance of the chest is so much greater in the former than the latter.

Auscultation reveals over the diseased part distinct and abundant fine subcrepitant râle; but the crepitant râle or fine crepitation, which is the pathognomonic sign of pneumonia in adults, and which in them is rarely wanting, is absent in young children, or is heard only when they make deep and free inspirations. It is most apt to be heard in young children during the deep inhalations which they make just before crying, or during the act of crying. It is, therefore, much less constant, less strongly marked, and more fugitive, in children than in adults, and is, in the former, replaced in good measure by a fine subcrepitant râle. In connection with these symptoms we always have more or less well-markėd bronchial respiration. This may be pure, which is rarely the case; it may be, as usually happens, associated with crepitant or subcrepitant râles, or it may be heard only in the expiration.

The symptoms above described show that the inflammation has reached the second stage, or that of red hepatization. After attaining this point, the disease usually remains stationary for a few days, and then either subsides, in favorable cases, by the resolution of the inflammation, or in unfavorable cases, terminates fatally in this stage, or else passes into the third stage and causes death by a more or less extensive suppuration of the lung. In favorable cases, which are said to be rare in very young infants, but more common in those several months old and in the second year of life, the severity of the symptoms gradually diminishes. The fever subsides, the pulse becoming less frequent, and the skin cooler and less dry; the breathing becomes easier and slower, and is attended with less pain; the cough grows looser, less frequent, less difficult, and ceases to be painful; the child begins to nurse without pain and with greater ease and facility; the restlessness and fretfulness, or the somnolence, when that has been a marked symptom, diminish, and the child becomes more placid, and sleeps quietly and tranquilly. The chest is now less dull than before on percussion; the bronchial respiration begins to diminish in intensity, and is very much masked by the subcrepitant râle, which becomes more and more evident, until at last it takes the place entirely of the bronchial breathing. The symptoms continuing to amend, the physical signs of the disease cease at length to be perceptible, the cough grows more and more loose and rare, the countenance becomes natural, the fever ceases, and convalescence is fully established.

In unfavorable cases, death may occur rather suddenly in the second stage, without any very decided change in the physical signs, from exhaustion or from the supervention of collapse of portions of the lung-tissue. In these cases, the breathing becomes more and more rapid and labored, or it becomes slower than before; the moist râles increase in abundance and extent, while the percussion often remains about the same; the difficulty of sucking increases, so that the child, when put to the breast, attempts to draw but two or three times and then lets go exhausted and distressed, or it makes no effort whatever; the cough becomes less frequent, but is still painful and difficult; the skin grows pale and white, excepting about the face, hands, and feet, where it often assumes a bluish or cyanotic hue; the extremities, and often the face too, become cool; the child becomes exceedingly restless, and then dull and perfectly quiet or comatose, and death at last occurs from asphyxia. In another class of cases, which, however, are much more rare in very young children than in older ones, the disease passes into the third stage, or that of suppuration so called. In such cases the febrile symptoms continue much longer than in those just now described; the pulse becomes, and continues for several days together, very frequent and jerking; the skin retains its heat and dryness, though it is often pale at the same time; the child is usually excessively irritable and distressed; the breathing is rapid and oppressed, and often very irregular and uneven; the dulness on percussion extends; the bronchial respiration becomes more distinct and is heard over larger surfaces, and is accompanied with less of the subcrepitant and crepitant râles; the cough is paroxysmal, painful, and often very harassing; the appetite is lost, and the sleep uneasy and often broken. These symptoms continue for several days, or a week or two, when they assume the same characters they exhibit in more rapidly fatal examples; that is to say, asphyctic phenomena develop themselves, and the child dies exhausted and comatose, or perhaps convulsed, or after presenting for some hours, or a day, more or less severe spasmodic affections of different muscles or of the extremities.

The *lobar pneumonia of children over two years*, and especially of those over five years of age, exhibits most of the symptoms that characterize the same disease in adults. The chief differences to be noticed at these two periods of life, are the greater predominance of bronchitis in children, particularly in those under five or six years of age, which gives to the physical signs some peculiar features not observed in adults; the frequent absence of expectoration, and when it is present, certain differences between it and that of adults; certain peculiarities in the character and seat of the side-pain; and the existence in many instances of more marked and more dangerous nervous symptoms.

The mode of onset is very different in different subjects. Generally, the attack begins with violent fever, increased frequency of breathing, more or less pain in the side, and short, dry cough. In such cases there is no difficulty in perceiving that the disease consists of some form of thoracic inflammation. But, in other instances, instead of this open and frank development, the disease comes on with symptoms which might well mislead any but a very attentive and competent physician, as to the true nature of the case. The most common cause of obscurity is a predominance of the nervous symptoms, which often gives to the case very much the aspect of a meningeal inflammation. In an example that occurred to one of ourselves, a boy between six and seven years old was seized, after a short exposure during a ride on a raw and cold day, with violent fever, pain in both ears, severe frontal headache, and great sensibility to light when exposed to it. He was, at the same time, very drowsy, sleeping nearly the whole day, but he could be roused when loudly and vehemently spoken to so as to answer a few questions and manifest great irritability, and, what was extremely suspicious of disease of the brain, when taken with the other symptoms, he vomited frequently. On the second day, the headache was very severe, the sensibility to light continued excessive, and he still vomited frequently, rejecting even water. The bowels were freely moved. There was up to this time no full cough, but only an occasional and slight hacking, that scarcely attracted attention. The respiration was accelerated, but there was no dyspnœa. No pneumonia could be detected, though carefully sought after. On the third day, the breathing was still more frequent, but not at all laborious; the vomiting continued, but the other nervous phenomena had lost some of their intensity and auscultation revealed well-marked bronchial respiration before and behind, over the summit of the right lung, while over the same region the percussion was dull. We have met with several cases in which the onset of pneumonia was attended with nervous symptoms that made the diagnosis difficult and obscure.

In other cases the onset of the disease is marked by symptoms o gastro-intestinal irritation, or by such a degree of fever and disturbance of the nervous system, with absence of evident local phenomena, as to render the nature of the attack obscure and uncertain. In one, for instance, occurring in a boy between four and five years old, and six weeks after recovery from measles, the attack began suddenly with violent fever, great restlessness and distress, vomiting, and distension of the abdomen. The case appeared to be one of gastro-intestinal disorder, as there was nothing to call attention to the thorax. On the second day, the symptoms were much worse, the skin being hot and dry, and the pulse one hundred and sixty in the minute, and jerking. The child was drowsy and heavy; it was difficult to make him answer questions, and his answers were confused and unintelligible; his movements were tremulous and uncertain. The tongue was dryish and very thickly coated, and he complained confusedly of pain in the abdomen, which was much distended, and sonorous on percussion. There was no sign of respiratory disease, except quickening of the breathing, and a very slight cough, scarcely to be noticed. At this moment, however, when scarlet fever was apprehended from the great frequency of the respiration, the drowsiness, and the tremulous character of the muscular movements, auscultation and percussion revealed the true nature of the sickness in the shape of a lobar pneumonia of the lower lobe of the left lung.

In a majority of the cases, however, instead of the obscure and deceptive onset we have just described, pneumonia begins with fever, acceleration of the respiration, pain in the side, and short, dry cough. In some instances the disease supervenes upon catarrh or bronchitis. The child ceases to play, refuses to be amused, and is either irritable and cross, or lies listlessly upon the bed, or, if still quite young, insists upon being kept upon the lap. In some few cases, in very young children, convulsions occur. The appetite is lost, or else very much diminished; the thirst is acute, and when the disease is once established, more urgent than in almost any other affection. Vomiting is quite common, especially in young children, but diarrhœa is rare, the bowels being generally more torpid than usual. From the first day often, and almost always by the second, we can perceive either crepitant or subcrepitant râle, and sometimes bronchial respiration, confined usually to one side, and more frequent below than above, though, be it remarked, not at all rare over the latter part.

As the case proceeds, the fever increases, the bronchial respiration becomes more distinct and is heard over a larger extent of surface, whilst the râles diminish in abundance. The skin is now very hot and dry, so as to impart a burning sensation to the hand; the pulse augments in frequency, seldom counting less than 140 in the minute, often mounting to 160, and in severe cases, and in young children, even to 170, and becoming full and hard; the respiration becomes more and more accelerated, until it rises to 40 or 50, and in a great many cases to 60, 70, or even 80, while it often becomes at the same time oppressed, and, when full inspirations are made, painful; the cough is frequent, dry, or almost dry, and painful at first, but after a few days begins to be moist, and, in children over six or seven years of age, is not unfrequently attended with an expectoration of rusty or sanguinolent sputa; the thirst continues intense, the appetite is null, and the child is very restless and irritable, or drowsy and inattentive. About the fourth or fifth day, as a general rule, the disease has attained its height, the febrile and local symptoms being then most marked, and the extent of the inflammation greatest, as shown by the physical signs.

At this stage of the disease, the bronchial respiration is generally strongly marked, being clear and distinct, audible both in inspiration and expiration, and accompanied by bronchophony and increased resonance of the cry. The dulness on percussion is also very evident, the change from the natural sound being easily perceptible on a comparison of the two sides.

The symptoms generally remain stationary at this point for one or two days, and then begin to subside. The heat of skin diminishes and perspiration often appears; the pulse falls in frequency and force; the respiration becomes slower, easier, and full inspirations can be taken without pain; the alæ nasi no longer dilate; the cough becomes quite loose, and ceases to be painful; the thirst is less acute; the child loses some of its irritability and restlessness, and if it have been soporose and dull, becomes more wakeful and observant; the flushing of the face disappears, while the expression is more natural. On auscultation, the bronchial respiration is found to have lost some of its intensity; it has become more distant, or it is heard only in the expiration, and is mingled with, or in part replaced by, crepitant or abundant subcrepitant râles. The dulness on percussion is less marked. A little later, the fever ceases entirely, the respiration reassumes its natural rate, the appetite returns, the thirst disappears, the cough subsides very much, and the child begins to be interested in its toys or occupations. About the tenth or fifteenth day, and in some cases rather earlier, convalescence is fairly established, though auscultation may still reveal some prolongation of the expiratory sound and diffuse resonance of the voice.

In unfavorable cases, death seldom occurs early in the disease, but usually at some distance of time from the invasion, and in consequence, no doubt, of the transition of the inflammation into the third or suppurative stage. In such cases the disease has usually pursued the course just described up to the period of resolution; but, instead of resolution and convalescence taking place, the fever continues, though perhaps with diminished violence, the skin being less intensely hot, and the pulse less full and active, while it remains quite as frequent. The breathing is sometimes less frequent than before, but it is often more laborious, and very generally it becomes irregular, and is easily hurried under exertion. The cough varies very much, being sometimes almost suppressed, and in other cases very troublesome; it is almost always loose. The strength diminishes, the voice becoming weak and feeble, and the muscular movements tremulous and languid;

the face looks pale, haggard, and sunken; the child is sometimes very restless, tossing about from time to time on the bed or lap, with a quick, short, and evidently feeble movement, or it is dull and soporose, awakening only when spoken to, but showing then by its fretfulness and peevishness that its intelligence is retained. While these symptoms are present, the extent over which the bronchial respiration is heard has generally augmented, showing the gradual extension of the hepatization, while outside of the part where the respiration is blowing, and sometimes over the same part, and intermingled with that sound, are heard more or less copious subcrepitant and mucous râles. This condition seldom lasts more than two or three days, at the end of which time the child dies in a state of coma, or after one or more convulsive seizures, which are the result of a gradually increasing asphyxia.

In other cases, again, the termination is more gradual. The child, after presenting many of the above symptoms, may seem to improve somewhat. The fever may diminish, the appetite return to some extent, the respiration become easier, the restlessness subside, and the child becomes more cheerful again; but the face continues pale, emaciation makes progress, the appetite fails again, the pulse remains frequent, diarrhœa comes on, the cough becomes more troublesome, thrush often attacks the mouth, the strength decays continually, and, after some weeks perhaps of struggling, the child dies in a state of great emaciation and debility.

The symptoms of *partial* pneumonia are much more obscure and uncertain than those of the lobar form of the disease. Owing to the fact that the inflamed patches of the lung are disseminated or scattered through healthy portions of the organ, the signs afforded by physical examination are either very imperfect, or entirely masked by the sounds produced in the healthy texture. We are forced, therefore, to depend much more in this than in the lobar form, on the rational symptoms, in determining the nature of the sickness. The rational symptoms of partial pneumonia are nearly the same as those of the lobar form. The chief differences between the two are in regard to the pain, the dyspnœa and, when there is expectoration, the amount of the sputa. The febrile and nervous symptoms, and the disturbances of the digestive system, are the same in the two forms, the only difference being in their degree of severity. In the lobar variety they are usually more acute and severe than in the partial. The mere degree of temperature attained does not differ materially in the two forms, and it is not unusual to find a temperature of 104° or 105° on the second day of an attack of the partial form. Roger (*loc. cit.*) notes, however, that while in lobar pneumonia the high temperature is sustained for six or seven days until defervescence occurs, in the partial form the course of the temperature is marked by a succession of irregular remissions and exacerbations. The local symptoms present important differences which should be noted. In the form under consideration, the pain is either wanting entirely, or is much less acute than in the lobar form. When the inflamed patches are few in number, and they are seated in the central parts of the lung, there is entire absence of pain; but when they are more numerous and superficial, pain is complained of, but it is usually diffuse, of slight intensity, changeable, and felt only during cough, or during full inspirations. It makes its appearance commonly on the first day, and very seldom after the third. Cough is rarely wanting. It usually marks the onset of the sickness, is extremely variable as to its frequency and severity, and is not acutely painful, as in the lobar form, unless the inflamed patches be superficial. There is seldom any considerable amount of expectoration, and in some cases none; when there is any it is small in quantity, and it may or may not be characteristic. In one case, however, that came under our observation, in which we had every reason to believe, from the nature of the rational symptoms, and from the absence of physical signs, that the disease was partial pneumonia, there was a rare expectoration of thick, viscous mucus, streaked with blood. The respiration is accelerated, and, when the lesion is at all extensive, there is dyspnœa, the degree of these symptoms being determined by the extent and number of the inflamed patches.

The physical signs are not, as above stated, very significant. The percussion is natural, the amount of tissue consolidated being insufficient to affect the sonorousness of the chest. Auscultation affords no signs of the pneumonic inflammation when the number of affected patches is small; when they are more numerous it is of some, but not of very great utility. Crepitant râle is sometimes heard here and there over circumscribed points of the thorax, and, disseminated in the same way, there is also heard in some instances rude respiration, prolonged expiratory murmur, and bronchial respiration. When, as often happens, this form of the disease coexists with bronchitis, it will be entirely concealed by the dry and moist râles of the latter affection.

The *duration* of pneumonia has been fixed with considerable accuracy by the observations of various persons. As a general rule, the disease reaches its highest point of severity in about four or five days, then remains stationary for one or two days, and diminishes regularly until between the tenth and fifteenth day, when convalescence is established. In our own practice, the longest duration in 22 unmixed cases, in which the period was accurately noted, was 17 days, and the shortest 5. The duration of the 22 cases was as follows: in 1 case, 17 days; in 2 cases, 14 days; in 1, 11; in 4, 10; in 5, 9; in 3, 8; in 2, 7; in 2, 6; and in 2, 5 days. One case lasted 33 days, but it was accompanied and followed by bronchitis.

Particular Symptoms; Physical Signs.—In order to practise auscultation and percussion in a young child, it should be placed, by the mother, in a sitting posture on her knee, while the physician, kneeling on the floor, or sitting on a low chair, makes the examination he deems necessary. If the child be old enough to take notice, it should be attracted and amused by some toy or glittering object. Even, however should it cry violently, much valuable information is to be obtained by the examination, for we can ascertain the presence or absence o râles and their characters during the deep inspirations between the cries, and can observe resonance of the cry and cough, and practise percussion.

The physical signs of *lobar pneumonia* are crepitant or subcrepitant râle, feeble respiration, bronchial respiration, bronchophony, resonance of the cry and cough, and dulness on percussion. They are, in fact, the same in the great majority of cases as in adults. Under five years of age, this form often begins with subcrepitant râle, while after that period the earliest stethoscopic signs are crepitant râle, or feeble respiration. The bronchial respiration makes its appearance soon after the subcrepitant or crepitant râle, is heard first in the expiration, and then in both inspiration and expiration, and is accompanied by bronchophony, resonance of the cry and cough, and dulness on percussion. Bronchial respiration was present in 46 of the 57 cases of lobar pneumonia observed by ourselves; crepitant râle was present in 31, and subcrepitant in 10.

These alterations of the auscultatory phenomena are confined to one side, in the great majority of cases, and are best observed over the postero-inferior portion of the lung. MM. Rilliet and Barthez state that they have never known the bronchial respiration to disappear, in favorable cases, before the fifth day, and in the majority not before the seventh, eighth, or ninth; while, in fatal cases, it continued to the moment of death. Its persistence is always a highly unfavorable symptom in very young children, whilst in those who are older, as in adults, it sometimes remains for several days or weeks, though the general symptoms have entirely disappeared.

RATIONAL SYMPTOMS.—*Cough* may be said to be invariably present. It is dry at first, and not very frequent, but in one or two days becomes more frequent, often very troublesome, and from dry and harsh, becomes more or less humid and loose. It continues until the disease moderates, lasting generally from nine to sixteen days. In fatal cases it usually persists to the last. In infants it is not very frequent, occurs in short paroxysms, and in fatal cases often ceases one or two days before death. MM. Rilliet and Barthez remark that in pneumonia of the upper lobes, it has a peculiar character. It is little, short, smothered, as it were; or piercing, teasing, or slightly hoarse. We will merely add that cough is sometimes scarcely noticeable in cases which simulate hydrocephalus, during the early part of the attack. In a case already referred to, that occurred to one of ourselves, in which the symptoms bore for several days very much the aspect of a meningeal attack, there was no full cough whatever during the first two days; on the third day, though auscultation and percussion showed the existence of pneumonia of the upper lobe of the right lung, the child coughed only three or four times, and it was not until the sixth day that it became at all frequent. In three other cases the cough was so slight in the early stages of the disease, during the continuance of the cerebral symptoms, as not to have been noticed unless particularly inquired after. Later in the attack, after three, four, or five days, and as the cerebral symptoms moderated, the cough became frequent and loose, and the pneumonic symptoms pursued their regular course.

Expectoration is almost invariably absent under five years of age. MM. Rilliet and Barthez, and Dr. Gerhard, have never observed rust-colored sputa under the age mentioned. In older children there is sometimes, though not very often, voluntary expectoration. Even in them, however, the sputa seldom present the characteristic rust-color and viscidity observed in adults, but consist simply of mucus tinged with blood, or of whitish, brownish, viscous, or non-viscous phlegm. We once, however, saw a child three and a half years old, voluntarily expectorate viscid mucus, tinged copiously with blood. Sanguinolent expectoration was noticed in five of the fifty-seven cases seen by ourselves (not including the one just spoken of). In three the sputa were of the characteristic rusty color, in one they were composed of mucus streaked with blood, and in another portions of mucus streaked with blood were rejected by coughing, and some also by vomiting. The age of the five subjects, just alluded to, was in each case between five and nine years. In another case (not included amongst the five), in a girl seven years old, affected with lobar pneumonia supervening upon pertussis, there was a free expectoration of tenacious mucus, sometimes streaked or dotted with blood, sometimes brownish, and sometimes rust-colored.

M. Valleix mentions a whitish or sanguinolent viscous froth, as sometimes escaping from the mouth of new-born children laboring under the disease, and Bouchut has also noticed in a single case, a little reddish sanguinolent froth, situated on the edge of the lips of an infant with pneumonia. We have never met with this symptom, but know of one case of a child within the month, who, during an attack of pneumonia, vomited mucus tinged with blood. The child died, and presented the lesions of pneumonia. The nipples of the mother were perfectly healthy, so that the blood could not have been sucked by the child from them, but must have consisted of the sputa which had been swallowed after being coughed into the fauces.

It is scarcely necessary to say that the absence of expectoration is only seeming, for children undoubtedly cough the sputa into the fauces, whence, instead of being rejected, as by the adult, they pass into the stomach.

Thoracic Pain.—It is impossible to ascertain the presence of this symptom with positive certainty prior to the age at which children talk, and very often not for some time after, as they refuse or do not know how to describe their sensations. And yet, even in infants, the presence or absence of the stitch in breathing, and of pain in coughing, may be inferred, almost with certainty, by watching the gestures and expression of the child, and the cries which accompany a full inspiration and the act of coughing. In effect, the deep inspirations induced by moving the child, those which take place during vomiting and gaping, and those also which occur in the act of coughing, cause the child to cry out suddenly and sharply, and give at the same moment an expreson of acute suffering to the countenance, which can be referred to othing else than the causes just mentioned, and which reveals almost s plainly as words the painfulness of a deep inhalation and of the ct of coughing. In older children, we have several times known the pain to be most intense, causing bitter and repeated complaints, with crying, fretting, and evident acute suffering. The seat of pain, as complained of by children who talk, ought also to be noticed, since the account given by them might well mislead an unwary and inexperienced physician. It is quite common, in fact, for them to refer the pain to the false ribs, to one of the flanks, to the abdomen, and even to the hip.

The *respiration* is always quickened, except where the constitution of the patient has been greatly deteriorated by long and severe illness or other cases, under which circumstances it may remain at the normal rate, or be very slightly accelerated. This symptom usually dates from the invasion, soon after which the breathing rises as high as 40, 50, and 60 in the minute in older children, and from 60 to 80 in the younger. It sometimes becomes excessively rapid, reaching, as it did in a case of pleuro-pneumonia in an infant six weeks old under our charge, 128. In favorable cases, the acceleration subsides usually about the seventh, eighth, or ninth day. In most of the cases the breathing is even and regular, while in others it is short, abdominal, uneven, and jerking. When the dyspnœa is very great in a young child, the nostrils dilate widely, the mouth remains open, and its angles are drawn downwards and outwards; the last of these symptoms is almost a fatal one. Sometimes the rhythm of the function is changed, so that it begins with a sudden, active, and moaning expiration, followed by the inspiration, after which comes the interval of rest. MM. Rilliet and Barthez state that unequal, jerking respiration, occurs almost exclusively in cases of inflammation of the upper lobes.

Physiognomy.—The face is almost invariably flushed. The color, at first scarlet, becomes after a day or two deeper and darker, and in severe cases assumes a livid-red tint. We have noticed in very severe pneumonia, in addition to the deep-red tint, a peculiar glazed appearance of the skin, which looks as though it had been varnished, while the edges of the flush are distinct and abrupt. The lips are generally deeply colored, simultaneously with the face. The flush commonly subsides about the same time, or a little before the diminution in the rate of the respiration. In fatal cases, the face is apt to lose its color, and become pale and sallow, as the unfavorable symptoms become more and more marked. The pallor of the face is most striking in severe and fatal cases occurring in infants; the face is blanched and the features pinched.

The expression of the face is one of anxiety and oppression in the early stage; in very severe cases, or those about to terminate unfavorably, the features become drawn and contracted.

Fever exists in all the idiopathic cases. The pulse, at all ages, is rarely under 130 from the first to the sixth or seventh day; in the youngest children it rises as high as 140, 160, and even 180; while in those who are older, it is seldom above 140. In favorable cases, it diminishes about the fifth, sixth, or seventh day. In fatal cases, it is apt to diminish at the same period, but soon becomes more frequent and continues so to the end.

The range of *temperature* in pneumonia is higher than in any other inflammatory disease of children. This is true of the disease in both of its forms—lobar and partial. The highest temperature we have found recorded for pneumonia is 105.8°, which Roger, in his latest contribution to this subject (*Recherches Cliniques sur les Mal. de l'Enfance*, 1872, p. 356), states was observed by him in 2 out of 47 cases of pneumonia. In two-thirds of the entire number the mercury reached or exceeded 104°; and the mean of the highest temperatures in all the cases was 103.9°. Such high degrees are more apt to be found in children over than under 2 years of age. The maximum temperature reached in any case would not seem to be much influenced by the seat or extent of the inflammation.

In lobar pneumonia the course of the temperature is regular and characteristic. The accession of fever is often very sudden, and the mercury may rapidly rise to its maximum point, marking 104°, 105°, or even 105.8°, within twelve hours from the onset. After the first abrupt rise, it is sustained nearly at the same point, with moderate morning remissions and evening exacerbations (the variation usually not exceeding one or one and a half degree) until defervescence, which is usually rapid, or even abrupt, occurs. In the *partial* form, on the other hand, the initial rise of temperature is less abrupt, and the course of the fever is marked by the occurrence of irregular remissions and exacerbations, which Roger attributes to the development of successive patches of pneumonia.

Usually the ratio between the temperature, pulse, and respiration is quite closely preserved, and an elevated degree of febrile heat is associated with marked acceleration of the pulse and breathing. Thus Roger found that the mean furnished by 47 cases was: temperature, 103.94°; pulse, 133; respirations, 52. It is not rare, following the defervescence, to find the temperature fall below the normal point, as to 98° or 97°, for a day or two.

The *nervous system* shows more or less marked symptoms of disorder. There is restlessness, peevishness, and irritability during the day, and these increase towards evening. As the night advances, the child becomes still more restless; infants will not sleep except in the arms, and wake crying or fretting every few minutes or hours; older children sleep uneasily, talk in their sleep, or start and cry out, and are often delirious. In some instances, the irritability is most distressing, both to the child and to those around. The child is constantly fretting and whining; it wants its playthings, but will not touch them; food, but rejects it; and slaps and scolds at everything about it. Convulsions sometimes occur at the invasion. They last an uncertain length of time, and are usually followed by insensibility, from which the child wakes with fever, accelerated respiration and cough, indicating the true seat of disease to be the lungs, and not the brain, as might at first be supposed. We have met with but three cases attended with convulsions. One occurred in a boy between ten and eleven years of age, on the second day of the disease. The attack was induced more, however, by an unwholesome meal taken on the first day of his sickness, than by the mere effect of the local inflammation. In a second case, which occurred in a boy between five and six years old, there were two convulsive seizures, a violent one on the first day of the pneumonia, and a slighter one a few days later. In the third case, which occurred in a boy aged two years, the pneumonia occurred in the course of intermittent fever; there were three marked convulsions, but the child subsequently recovered perfectly. The headache is sometimes very severe; in a few instances we have known it to be so violent as to constitute the most prominent symptom of the case. On one occasion, indeed, it was so intense, and so much complained of, during the first two days of the fever, as to withdraw our attention from the true seat of disease, and it was not until the third day that we discovered the existence of pneumonia. The cough was in this, as in other instances, in which the nervous symptoms were strongly marked, so slight as to escape notice.

Digestive Organs.—Complete anorexia is generally present from the first; the thirst is intense, greater indeed than in almost any other affection of childhood. The tongue is moist, as a general rule, and covered with a whitish or yellowish fur. Vomiting and diarrhœa occur at the invasion of about half the cases in hospitals; in private practice, vomiting often occurs, but diarrhœa much less frequently.

Urine.—The amount of urine is materially lessened in acute pneumonia, the extent of the reduction being from one-third to one-half (Parkes).

During the height of the disease the urea is increased, and with it, as in most febrile diseases, the uric acid. Simon and Redtenbacher first called attention to the fact that the chloride of sodium is diminished or entirely absent during the early period and at the commencement of hepatization, and reappears during, or rather after resolution; and further researches have fully confirmed this observation, since very few exceptional cases have yet been recorded. The disappearance does not depend upon the reduced diet, since Howitz and Parkes both state that even when chloride of sodium is administered, none can be detected subsequently in the urine. And the fact that it is in reality retained in the system, is further shown by the very excessive excretion during convalescence. According to Beale's observations, the exudation in the lung is very rich in chloride of sodium; and it has been found that as this salt disappears from the urine, it appears in the sputa, and in turn as it returns in the urine, it disappears from the sputa.

It is true that more extended observation has shown that the chloride of sodium is absent or deficient in many other affections, both febrile and inflammatory; but still, although not pathognomonic of pneumonia, this sign is an aid in its diagnosis, and probably serves to distinguish it from collapse of the lung or tuberculous consolidation.

One more condition of the urine in pneumonia, although as yet, so far as we know, only noticed in adults, deserves attention. We allude to the presence of albumen, which has been noticed by several observers, as Finger, Becquerel, Parkes, and Heller, in almost 45 per cent. of their cases; though others have but rarely found it.

The period of its occurrence is variable; according to Heller and Parkes, it appears at the time when the chlorides are most deficient, as hepatization advances. The fatality is much increased in cases where albuminuria is present; the combined record of the observers above referred to, yielding a mortality of almost 50 per cent. of such cases; whilst the mortality in cases without albuminous urine was only 14 per cent. According to Parkes, renal cylinders are very common in the albuminous urine of pneumonia; and a little blood is also frequently present, but is usually out of all proportion to the albumen.

Diagnosis.—The *lobar* pneumonia of children is most liable to be confounded with bronchitis, pleurisy, and meningitis. There is little probability, however, that lobar pneumonia would be mistaken for bronchitis by any but a careless or incompetent observer; for the presence, in the former, of subcrepitant, and very often of crepitant râles, of bronchial respiration, bronchophony, resonance of the cry and cough, and dull or flat percussion, confined to one side, would easily distinguish it from bronchitis, which is marked by dry and moist râles over both sides of the chest, and by a normal condition of the percussion. It is difficult and often impossible, as already stated, to detect the existence of *partial* pneumonia, or at least to make the diagnosis with absolute certainty. The cause of the difficulty, as before explained, lies in the fact that it presents, in a great many instances, no clear physical signs. When the number of inflamed nodules scattered through the healthy texture of the lung is small, and especially when they are deeply seated, no alteration whatever of the natural respiratory sounds can be perceived, and we are obliged to depend entirely upon the rational symptoms,—the accelerated breathing, oppression, pain, cough, fever, and the absence of the physical signs of other pulmonary inflammation. A careful study of the temperature may here be of service. We have seen that in pneumonia the temperature usually rises quickly to 104° or 105°, while in bronchitis, it rarely attains even the lower of these, and often does not exceed 101° or 102°. Sometimes the presence of the characteristic sputa of pneumonia will, in older children, make the diagnosis clear. When the inflamed nodules are situated near the surface of the lung, we may, in some instances, detect crepitant or fine subcrepitant râle, and bronchial respiration, over circumscribed portions of the lung, and there would be, under such circumstances, no hesitation as to the diagnosis.

It has been stated that pneumonia might be confounded with pleurisy. This could not happen in regard to the partial form, as the slighter degree of the pain, the limited extent of the râle and bronchial respiration, and the absence of dulness on percussion in the latter, would prevent such a mistake. The distinction between pleurisy and the lobar form is more difficult, but may generally be made out by attention to he fact, that pleurisy is rare under six years of age; by the greater everity of the pain, the less abrupt and extreme elevation of temperature, the absence of râles and presence of friction-sound, the effect of change of position on the sounds yielded by percussion, the shorter duration and greater mildness of the general symptoms, the entire absence or small amount of expectoration, and by the continued dryness of the cough in pleurisy; and lastly, by the disposition on the part of pleurisy to become chronic, while pneumonia nearly always runs an acute course.

Pneumonia in children not unfrequently simulates, in its early stage, an attack of meningitis, constituting a form of the disease sometimes called *cerebral pneumonia.* Vomiting, constipation, extreme irritability or restlessness, and complaints of headache, occur in both; while the absence of thoracic symptoms to draw attention to the true seat of the disease in pneumonia, may readily mislead. The cough in the early stage of pneumonia is sometimes very slight, and not being observed by the attendants, is not reported to the physician. The frequency of the respiration is overlooked, or, if noticed, is ascribed to the fever, which is supposed to depend on the cerebral inflammation. In pneumonia, however, the vomiting is not usually very frequent, nor very obstinate, nor are the bowels so much constipated as in acute hydrocephalus. These variations from the ordinary symptoms of the latter disease, minute though they be, ought to attract the notice of the physician, and lead him to examine the case more carefully when, in all probability, the physical signs would immediately reveal the pneumonia. We may mention, in illustration, that we attended a boy six years old, who, for three days, suffered from violent fever and excruciating headache, which last was the only symptom complained of. There was neither cough, expectoration, nor any marked acceleration of the respiration. After three days the headache moderated, and he had slight pain in his side; on examination, we found him laboring under well-marked lobar pneumonia. In April, 1847, one of us was called to see a boy nineteen months old, who had been taken sick with slight fever, a little hoarse cough, and mild pharyngitis. After remaining in this condition for five days, he began to be drowsy and very irritable, the surface became pale, and the extremities rather cooler than natural. From the sixth to the tenth day, there was great somnolence, the child sleeping nearly all the time; when waked from sleep, he was always exceedingly irritable and cross, scarcely opening his eyes, and then shutting them again immediately to avoid the light, which was evidently painful. During this time he took scarcely any food, but little drink, and vomited several times freely; the bowels were moved without medicine; the surface remained very pale, and the extremities often cool; the pulse was frequent and small, the respiration perfectly regular, for which reason it attracted no attention, and there was *no cough* whatever. Under these circumstances, we hesitated between regarding the case as one of meningitis, or of hydrocephaloid disease, as described by Dr. M. Hall. We took the latter view, however, and treated it with small quantities of brandy, cold to the head, and the frequent employment of mustard pediluvia. From the eleventh day the child began to improve; it would open its eyes from time to time, and look round for a few moments; the face began to show a slight degree of color, and the palms of the hands, which had been white and transparent, exhibited a tinge of the natural pink hue which they have in children. Observing about this time that the respiration was accelerated, though perfectly free and regular, and without cough, we counted it, and were astonished to find it 80 in the minute. We now examined the chest carefully, and finding slight dulness on percussion with bronchial respiration, over the inferior half of the left side behind, immediately understood the nature of the case: it was one of latent pneumonia, simulating hydrocephalus. The child was now treated for pneumonia, and after an illness of twenty-seven days longer, recovered perfectly. As the case progressed, the rational signs of pneumonia were more and more apparent, the cough becoming frequent and painful, and after a time loose, while the cerebral symptoms gradually disappeared.

In addition to these cases, we have met with several others which during the early stage resembled very closely the invasion of cerebral disease. One of these has already been referred to in the account of the symptoms of the disease. Two others occurred in children within the year, and one in a child between one and two years old. Attention, however, to the rate of the respiration and the physical signs, and the presence of slight cough, revealed, in two of them, after a little hesitation, the true character of the attacks. The third case, which occurred in one of the children within the year, was unattended by any cough during the first few days, and was, therefore, very obscure, until our attention was attracted by an acceleration of the respiration, when the physical signs, and, at a later period, the cough, explained the real nature of the attack. We may remark, in addition, that in all these cases, the absence of constipation, the infrequency and short duration of the vomiting, and some clearness of the intelligence when the child was fairly roused, though but for a few moments, from its state of somnolence, were other motives for doubting the attacks to be meningitis.

We have dwelt at length upon the danger of making this serious mistake in diagnosis, in the hope that our remarks will aid in impressing upon the mind of our readers the great importance, which has indeed been alluded to on several previous occasions, of making a careful examination of the chest by auscultation and percussion in every case of acute disease in children, even though the symptoms do not appear to indicate any affection of the heart or lungs.

Dr. West states that pneumonia is often overlooked in teething children, in whom the cough is called a tooth-cough, whilst the diarrhœa, which frequently occurs, and becomes the prominent symptom, is supposed to depend upon dentition, and is alone attended to. The diarrhœa is obstinate, and when, at last, the cough attracts attention, it is ascribed to phthisis, and the physician is astonished to find at the autopsy purulent infiltration of the lungs, but no tubercles, and no disease of the intestines. The diagnosis is to be correctly made, under such circumstances, only by careful physical examination.

PROGNOSIS.—It may be stated in general terms that pneumonia is the more dangerous in proportion as the child in whom it occurs is younger; and that the secondary, consecutive, or intercurrent form of the disease is much more dangerous than the primary. It is usually supposed to be almost necessarily fatal in new-born children, and to be still very dangerous up to the sixth year of age. There has been so much confusion, however, in regard to atelectasis of the lung and true pneumonia until within a few years past, that it is scarcely possible to trust to former statistics upon this point. From six years of age up to fifteen, the disease is generally curable when of the primary form; when of the secondary form the result is much more doubtful, and will depend in great measure, of course, on the nature of the disorder during or after which it occurs.

MM. Rilliet and Barthez (*loc. cit.*, p. 535) state that they lost about one-eighth of their cases in private practice. Of these, the youngest was a year old, the oldest, three years old. To quote their own words: "Some evidently died of accidents caused by the medication (poisoning by tartar emetic); one was the victim of a relapse, due to faulty hygienic care; and others died of cerebral pneumonia of the upper lobe; they were undergoing the process of dentition." In the hospital, they lost a seventh of their patients. The subjects under five years of age died of cerebral, gangrenous, or intestinal complications. Those over five years of age died, some because they were scrofulous or feeble, the inflammation, though lobar, being double; and the others, in consequence of the inflammation having become complicated with pleurisy, scarlet fever, or meningitis. They add, that in the hospital, six-sevenths of the patients attacked with secondary pneumonia died.

In 1862, however, Barthez stated, in a memoir to the French Academy (*Med. Times and Gaz.*, May 10th, 1862), that during the previous 7 years, having abandoned the use of depletion in the pneumonia of children, he had treated 212 cases, with a loss of but 2 patients.

The results of our own experience, which, it ought to be remarked, has been acquired chiefly in private practice amongst the easy classes of society, have been as follows: Of 65 cases of well-marked lobar pneumonia, only 2 were fatal. Of these two, one occurred in an infant six weeks old, and was accompanied with extensive and violent pleurisy, and the other occurred in a child between two and three years old, lasted thirty-three days, and was attended with considerable bronchitic inflammation.

In addition to these, we have seen a certain number of cases which are not included in the statistics of our own experience, since some of them were only seen, and, perhaps, but a single time, in consultation, while others occurred among the children in the large public institutions of this city. A far larger proportion of these latter cases proved fatal.

We may conclude, therefore, that pneumonia under two years of age is always dangerous, and much more so when secondary than when primary; that primary pneumonia, between the ages of two and five years, will, if treated judiciously, terminate favorably in the great majority of cases in private practice; and that when the disease attacks children between six and fifteen years of age, the termination is nearly always in health.

The following are some of the most unfavorable symptoms of the disease: convulsions; small, weak pulse; extreme rapidity of the respiration; persistence of the bronchial respiration in young children; incomplete resolution of the disease within the ordinary period; excessive and obstinate diarrhœa; severe cerebral symptoms; great emaciation; greatly altered physiognomy; excessive irritability; and a yellowish tint of the skin. M. Trousseau regards as an unfavorable symptom the occurrence of swelling of the veins of the hands, which he supposes to depend on an obstacle to the function of hæmatosis.

Treatment.—When one of the former editions of this work was published, fourteen years ago, a great change had begun to take place in medical opinion as to the proper treatment of disease, and especially of acute disease. In that edition this change of opinion was referred to, and its effect upon our own convictions and methods of procedure freely acknowledged. Since that period this revolution, as it might be called, has continued to make progress, until, at the present moment, no one can candidly express his own views without referring to it. In view of these facts, we shall not hesitate to write at some length on the treatment of pneumonia, in order that our readers, and especially the younger members of the profession, may be able to comprehend not only the changes that have taken place, but some of their causes.

There is another consideration which has been forced upon us by time and experience, which makes us unwilling to dismiss the treatment of so important a disease in a few words, and this is, that the method of cure to be followed in individual cases must be determined not alone by the simple fact that the patient has an inflammatory exudation in the lung-tissue, but, in large measure, by the state of the general vitality of the subject. What folly, for instance, to suppose that we can safely apply the same therapeutic measures to a case of pneumonia in a child just issuing out of severe measles, to one in the midst of a dangerous typhoid fever, to a third in the spasms of hooping-cough, or to a fourth who was yesterday in consummate health, with every function, up to the moment of the attack, in the finest possible working order. To be sure, this is putting the case in very strong terms, but they are not too decided to make our meaning clear.

Moreover, we think there is a tendency, in some of the later works on diseases of children, and in some, too, of the general treatises on the practice of medicine, to lengthened scientific descriptions of anatomical changes, symptoms, diagnosis, &c., and to a corresponding diminution of the space devoted to therapeutics. This error, as we think it (not to be wondered at, perhaps, when we consider the relative difficulty of writing on these different subjects), we desire to avoid, and, indeed, we have found it impossible to state our opinions on the subject except at some length.

Bloodletting.—Twenty years ago depletion formed an almost inevitable item in the treatment of pneumonia, but, within the last eight or ten years, the views of most observers have undergone a more or less radical change in regard to its utility and necessity. Some have abandoned it altogether; others employ it still to a moderate extent. In order that the younger practitioner may see the changes which have taken place in this respect, we shall quote the views of some of the more important authorities, and then give our own.

Dr. Charles West (4th Am. ed., from 5th English ed., page 285) writes as follows: "I cannot forget the good results which I saw years ago from the abstraction of blood at the outset of an attack of pneumonia in previously healthy children." He, however, does not advise depletion when small crepitation has become generally diffused, still less when dulness or bronchial breathing is perceptible. He gives no statistics as to his own results whatever. Dr. J. Lewis Smith, of New York, in his work, does not even mention bloodletting. Dr. Thomas Hillier, of London, says of bloodletting that it "is now for the most part discarded. I have never had occasion to resort to it." He says further, however, that cases might occur where it would be proper to recommend it. Such conditions would be, the second day of the disease, a large extent of inflammation of the lung-tissue, full and bounding pulse, great pain and dyspnœa, and a temperature of 105° or more. If these conditions existed in a previously healthy child, he would think it wise to take a few ounces of blood from the arm. We have already referred to the communication from M. Barthez to the Academy of Medicine of Paris, in April, 1862, intended to vindicate the expectant treatment of pneumonia in early life. In this paper it is stated that of 212 cases of lobar pneumonia, occurring between the ages of two and fifteen, in the course of seven years, at the Hôpital Ste. Eugénie, only 2 had a fatal termination, although no approach to active treatment was adopted in more than a sixth of the number. Dr. J. Hughes Bennett gives, in *The Practitioner*, for May, 1869, the results of the restorative treatment of pneumonia in 153 cases. Of these, 129 were simple and 24 complicated cases. Of the 129 simple or uncomplicated cases, of which 35 were double, all recovered. Among the 24 complicated cases there were 5 deaths, making of the whole number a mortality of 1 in $30\frac{3}{5}$ cases. Dr. Bennett's cases all occurred in adults, but the results are useful to us as showing the effects of this kind of treatment.

In a former edition of this work it was stated that one of us had treated 50 cases of well-marked lobar pneumonia, with 2 deaths, in private practice. Full notes of only 46 of these cases were kept. Of the 46 cases, 39 were primary or uncomplicated, and 7 secondary or complicated. The 2 fatal cases occurred, one at six weeks old, and this was attended with very severe pleuritic inflammation, and the other between two and three years old; the latter case lasted 33 days, and was attended with considerable bronchitic inflammation. Depletion was employed in 16 of the 39 primary, and in 2 of the 7 secondary cases. It is proper to state that depletion was not employed in either of the fatal cases.

How difficult is the task of estimating the comparative value of different plans of treatment in any given disease. MM. Rilliet and Barthez lost one-eighth of their cases of pneumonia in private practice, and one-seventh in hospital. We lost one-twenty-fifth of ours in private practice; a result very nearly as good as Dr. Bennett's, though ours were all in children under 15 years of age, and of 37, whose ages were recorded, 19 were under 5 years (2 in the first year, 3 in the second, 5 in the third, 4 in the fourth, 5 in the fifth). Dr. Bennett condemns bleeding almost wholly; we took blood in 16 of 39 primary, and in 2 of 7 complicated cases, and did not deplete at all in the 2 fatal cases. M. Barthez reports 212 cases, treated by the expectant method, with only 2 deaths, or less than one in a hundred; and these cases, too, in children between 2 and 15 years of age, in hospital practice. These last statistics are the most surprising we have seen. We have been unable to find the original memoir of M. Barthez, but have seen the report made to the Academy of Medicine, by M. Blache (*Bulletin de l'Acad. Imp. de Médecine*, t. xxx, p. 21), on the memoir, in which it is stated that "the author has taken care to eliminate the lobular or generalized pneumonias, the pseudo-lobar pneumonias, broncho-pneumonias, and catarrhal pneumonias; he has also thrown aside the lobar congestions which occur in the course of low fevers, and the secondary lobar hepatizations; that is to say, those which occur in the course of any well-determined disease, and particularly tuberculosis." We cannot help thinking that the elimination of so many forms of pneumonia, must be a chief reason for the very great success of the plan of treatment used.

This much, however, has been plainly established by the observations and experience of late years, that the old plan of bleeding, as a rule of absolute practice, merely because of the existence of pneumonia, and especially the Sangrado system of bleeding, *coup sur coup*, was a gross mistake, and one which did great harm. But we do not think it has been proved that the restorative or expectant system, to the exclusion of bloodletting under any circumstances, is always and inevitably the right one. We have been led to think that bloodletting was not the only cause of the heavy mortality under the old systems of treatment, but that the use of such agents as antimony, ipecacuanha, and perhaps calomel, in large and frequently administered, and long-continued doses (and particularly the antimony) by their action upon the stomach, in destroying all power to take and digest food, and by the general prostration which their action (especially antimony) upon the nervous system occasioned, were answerable for a large share of the fatal results of those days. We doubt, in fact, whether depletion, used in anything like moderation, is not safer for the patient than the continued use, for two or three days, of nauseants and depressants, more particularly of antimony. But of the action of antimony upon children, we shall speak more at length hereafter.

Our own opinion, after the enlarged experience of later years, is, that depletion should not be used save in exceptional cases. When the pneumonia is pursuing a regular and safe course, it is best to trust to the simple means to be spoken of hereafter—to follow a mild expectant method. Where the physician doubts as to its propriety, and especially when he is young and inexperienced, it is safest to abstain from it entirely, or to employ it only in a very moderate degree. But there is a certain class of cases, in which we believe that local depletion, by cups and leeches, is not only allowable but most useful. When the subject is vigorous and strong, with a fine sanguification; when the temperature is very high; the pulse strong and full; the muscular force good, and the side-pain and cough very severe, we think that the local abstraction of from two to four ounces of blood, at the age of three or four years, has great power to relieve all these symptoms. Again, when the dyspnœa is very great; when the heart pulsates with great force, whilst the pulse is small and feeble, showing that the right heart is overloaded, and the arteries comparatively empty, in consequence of obstruction to the passage of blood through the lungs; and when the child is tolerably vigorous, and not reduced by previous illness, a moderate venesection is often of more use, and of more efficacy in palliating these conditions, than any treatment we know of. The quantity to be taken should seldom be over four ounces, at the ages of from three years and upwards. We venture upon these statements the more boldly when we find such men as Chambers and Niemeyer, and even Bennett, giving the same advice. Dr. Bennett (*loc. cit.*) lays down amongst his axioms the following: "Small bloodlettings, of from six to eight ounces, may be used in extreme cases, more especially in double pneumonia and broncho-pneumonia, as a palliative to relieve tension of the bloodvessels and congestion of the right heart and lungs." Niemeyer (*Text-Book of Pract. Med.*, Amer. ed., vol. i, p. 184) says, pithily: "Highly as I prize venesection, however, in certain emergencies which may arise in the disease, I had rather that any one, dear to me, and sick of pneumonia, were in the hands of a homœopath, than in the hands of a physician who thinks that he carries the issue of the malady upon the point of his lancet." He recommends venesection in three conditions: 1. When the pneumonia has attacked a vigorous and hitherto healthy subject, is of recent occurrence, the temperature being higher than 105° F., and the frequence of the pulse rating at more than 120 beats a minute. "Here danger threatens from the violence of the fever, and free venesection will reduce the temperature, and lessen the frequence of the pulse. In those who are already debilitated and anæmic, bleeding increases the danger of exhaustion. Should the fever be moderate, bloodletting is not indicated, even in healthy and vigorous individuals." 2. "When collateral œdema, in the portions of the lung unaffected by pneumonia, is causing danger to life, the pressure of the blood is reduced by bleeding, and by prevention of further transudation of serum into the vesicles, insufficience of the lung, and carbonic acid poisoning are averted. Whenever the great frequence of respiration, in the commencement of pneumonia, cannot be traced to fever, pain, and to the extent of the pneumonic process alone, *as soon as a serous, foamy expectoration appears together with a respiration of forty or fifty breaths a minute*, and when th rattle in the chest does not cease for awhile after the patient has coughed, we ought at once to practice a copious venesection, in order to reduce the mass of blood, and to moderate the collateral pressure. The third indication for bleeding arises upon the appearance of symptoms of pressure upon the brain, not headache and delirium, but a state of stupor or transient paralysis." We have made this long quotation because the authority is so high, and because we have nowhere found such clear and concise statements upon this most important point of practice.

Antimony.—In a former edition of this work it was stated that tartar emetic, in the dose recommended by some of the highest authorities of the day, had been found by us a very dangerous drug. Time has but confirmed this opinion. At that time we were in the habit of administering it in doses of a forty-fifth or sixtieth of a grain every hour or two hours. This was at a time when Rilliet and Barthez used it in doses of from two to four grains, dissolved in four ounces of water, in twenty-four hours, for very young children, and for those who were older six grains in the same space of time. They continued it for two, three, or four days, and advised its suspension should it give rise to excessive vomiting or severe diarrhœa. Dr. West at that time gave it in doses of one-eighth of a grain, at the age of two years, every ten minutes, until vomiting was produced; to be continued every hour or two afterwards for a period of twenty-four or thirty-six hours. Dr. West had reduced the doses, and the time of continuing it, one-half, between the time referred to and the date of his essay on pneumonia, published in 1843.

The doses used by us, as mentioned above, may seem to some who have not employed them ludicrously small, but we soon found that even they were quite frequently, in certain constitutions, more than could be given with safety. Antimony, even in those small quantities, sometimes caused a very peculiar general prostration. Perhaps without any vomiting whatever, or with only a rare effort at that act, the patient would refuse all nourishment, become very pale and weak, grow limp and motionless, take on a haggard and pinched expression of face pass into a state in which it would pay no attention to what was going on around, be very peevish and irritable when disturbed, get a very frequent and feeble pulse, and look to an experienced eye as though a very little deeper degree of such prostration might end fatally. Afte seeing this condition a few times, and finding that the withdrawal o the drug and the use of small doses of brandy (ten to twenty drops i water or milk) every hour or two hours, was followed by rapid im provement, we learned the greatest caution in the use of the remedy Of late years we never use tartar emetic at all, but give, not unfre quently, in strong and vigorous children, with high febrile heat an rapid circulation, small doses of the precipitated sulphuret of antimony always watching its effects carefully, and withdrawing it at once shoul the above symptoms make their appearance. The formula found most useful and safest is the following:

℞.—Antimon. Sulphurat, ... gr. j.
Pulv. Doveri, ... gr. iij.
Sacch. Alb., ... gr. xij.
M. et div. in chart. no. xii. One to be given every two, three, or four hours.

To infants under two years of age it is best to give no antimony at all.

Calomel.—In former years, in obedience to the prevailing rules of the day, we gave calomel in very moderate quantities in some cases of pneumonia. We never felt sure that it was of any special service, and of latter years have abandoned it altogether. It is one of the drugs which, we think, ought not to be given except under some very clear indication. Such indications rarely exist in pneumonia, and therefore we do not prescribe it.

Salines.—*Citrate of potash*, either in the form of the neutral mixture or dissolved simply in water with a little sugar, is one of the best febrifuges that can be used. In doses of two and a half grains to children over three or four years old, and half a grain to a grain for younger children and infants, every two hours, it is an excellent remedy. It may be given alone, or combined with small doses of syrup of ipecacuanha and opium. Spirit of nitrous ether may be added when the urine is scanty, or when the ipecacuanha cannot be borne.

The solution of *acetate of ammonia*, either alone or combined with the spirit of nitrous ether, is useful when the child is feeble, and when the stomach or bowels are irritable, in which case the citrate of potash sometimes offends the stomach and acts upon the bowels. The dose of this remedy may be from twenty or thirty drops to half a drachm or a drachm, according to the age, in sweetened water, or some aromatic water, every two hours.

Quinia is unquestionably a remedy of great value in the pneumonia of children. When given in full doses, it diminishes the intense febrile heat and the great rapidity of pulse; and, at the same time, is believed by many observers, to possess a tendency to check the extension of the exudation process. It is usually perfectly well accepted by the stomach, and does not interfere with the power of taking food; while, on the other hand, by its tonic influence it must be of service in sustaining the system until the necessary stages of this exhausting disease have been passed.

Ipecacuanha is preferable to antimony in all conditions except those referred to above. In infants under two years of age, in children of highly nervous temperament, or of feeble and delicate constitutions, in most cases of the secondary form, and in all mild cases, it is much safer than the other drug. The most convenient preparation is the syrup, of which ten drops may be given every two hours at four years of age, five drops between one and three years, and from one to three drops to infants of two or three months. It is often useful to combine the spirit of nitrous ether with it, and, when the stomach is irritable, or the patient very restless and irritable, to add small doses of opium. When the patient is much oppressed by the presence of secretions in the bronchia, and not too much prostrated, an emetic is often very useful. Ipecacuanha is the most suitable remedy for this purpose, as it produces less exhaustion and depression than any other, except, perhaps, alum.

Muriate of Ammonia has of late years been very largely employed in the acute pulmonary affections both of adults and children. It has seemed to us to possess the power of hastening the softening and resolution of the exudation, and, when there is expectoration, of rendering it less viscous and freer. The best period for administering it is after the hepatization is clearly established and the attack has reached its full development. It may then be given, associated with the febrifuge employed, or else dissolved in a little syrup of Tolu or syrup of wild cherry bark and water. The proper dose is one grain for children under 2 years of age, and 2 to 3 for those between 2 and 5 years, given every 6, 5, or 4 hours, according to its effect and the way in which it is tolerated by the stomach.

Purgatives.—A *purgative* dose is useful at the beginning of the attack, when the child is constipated, and when the abdomen is tumid and hard. A teaspoonful of castor oil, or two teaspoonfuls of simple syrup of rhubarb, will answer every purpose. After this period cathartics need be used only so as to keep the bowels moderately soluble. If they are moved spontaneously every two or three days, there is no occasion to give purgative doses. If they do not move, a simple enema, or the doses mentioned, will be sufficient. Violent or frequently repeated doses of purgatives are injurious, by exhausting the patient through the disturbance of the stomach which they occasion, or by setting up diarrhœa.

External Applications.—MM. Rilliet and Barthez were of opinion that neither blisters, Burgundy pitch, nor tartar-emetic plasters, exerted the least influence upon any one of the symptoms of pneumonia, but that, on the contrary, they increased the fever. Dr. West gave up the use of blisters entirely, in consequence of the irritation and fever they occasioned, and because of the disposition to sloughing which he observed to follow their use amongst the poor. At one time we thought we had observed great benefit from the use of a blister when other means had failed to produce some moderation of the symptoms after four or five days. If they are used at all, it ought to be with great care, especially in very young or feeble children, whose nutrition is depraved. In children of less than two or three years old, a blister should never remain on the skin longer than two hours. As a general rule, the mother should be told positively to remove it at the end of one hour and a half, even though the surface be still unchanged. A warm bread-and-milk poultice is then to be used as a dressing, and this rarely fails to cause vesication in a few hours. Employed in this way, we have had but once the misfortune to see a blistered surface slough, and this occurred in a child whose skin had been very much irritated by frictions with amber oil and ammonia.

Since the spring of 1845, however, when we were led to make frequent use of mustard poultices and foot-baths in the treatment of the nchitis and pneumonia of measles, we have rarely employed blisters, t have preferred the employment several times a day of the remes just indicated. Two parts of Indian meal and one of mustard, for ung children, and for those who are older equal parts of each, are to mixed with warm water, and spread thickly like a poultice on a iece of flannel or rag five or six inches square. This is to be covered ith fine muslin, linen, or gauze, and applied first over the back and hen the front of the thorax. It may remain from fifteen to forty minutes, or until the child cries or complains, or until the skin is reddened. The mustard foot-baths may be employed at the same time with the poultices. These applications are useful whenever the oppression is very great, and, when resorted to in the evening, they often allay irritability, and dispose the child to sleep. The number of applications to be made in a day must depend on the urgency of the symptoms. We have employed them from once a day to every two or three hours.

Dr. Chambers (*loc. cit.*) strongly recommends the use of linseed-meal poultices, as a "direct restorative means, about the use of which also anywhere you need have no manner of hesitation." He claims that it allays the pain; relieves dyspnœa; induces moisture and activity of the skin; and promotes the absorption of the exudation. He directs the poultice to be spread half an inch thick on a cloth or flannel as broad as the circumference of the thorax, and deep enough to cover the whole chest, from the collar bones to the hypochondria. In adults this will usually keep in place of its own accord, but in children you should have a tape stitched on in front, and a tape behind, which you can tie over the shoulder in the manner of a shoulder-strap.

Tonics and stimulants are to be resorted to in cases which manifest undoubted signs of debility. When, therefore, the attack occurs in a feeble child; in secondary cases; when the inflammation remains unresolved after the use of other remedies, and when extensive bronchial respiration persists, though the fever has moderated; or when, in any case, during the acute stage, the child falls into a typhoid state, as shown by pallor of the surface, frequent, uneven pulse, dry tongue, prostration of muscular power, and either incessant jactitation or the listless quiet of exhaustion; attention must be paid to the state of the constitution even more than to the local disease. The vital forces must be sustained and strengthened in order to give time and power to carry on the operations necessary for the removal of the local obstruction. To effect this purpose, we must depend upon the use of food, alcoholic stimuli, and certain tonics. The *food* most suitable for such a condition is milk, animal broths, soft-boiled eggs, and perhaps small quantities of raw or slightly cooked meats. The best stimulants are brandy, given either in the milk or in water, as the child will best take it, and wine and water, or wine-whey. The amount of brandy given may be stated as 3, 4, or 5 teaspoonfuls in the course of 24 hours at 4 years of age. The best *tonic* to give in conjunction with the alcoholic stimulus is, as has already been stated, quinia, which should be administered in the quantity of from gr. iv to gr. vj in 24 hours, given in divided dos When the exhaustion is marked, especially when associated with gre embarrassment of respiration and copious viscid secretion from t bronchial tubes, we should recommend the use of the muriate or ca bonate of ammonia, either of which may be given in mucilage, in dos of gr. ij to iij every 3 or 4 hours, at 4 or 5 years of age.

Opium is constantly of great service in the treatment of pneumoni It should always be used when the patient suffers much, either from the side-pain or from cough, whether this be harassing and exhausting from its mere frequency and persistence, or from its effect in developing the stitch; when there is painful jactitation, an unusual degree of distress and malaise, or marked tendency to morbid vigilance. When the fever is very high, the pulse vibrating, the nerves on a rack, opium is of the greatest advantage. The mere comfort it gives is a good warrant for its use, but it has long seemed to us to aid in shortening the duration and lessening the severity of the constitutional disturbance.

The choice of the preparation, and the doses and times of administration, must vary in different cases. When used early in the case, to act upon the circulation and allay general irritability, it is best to give it with the febrifuge every two or three hours. When used to control cough, it can be added to the sulphurated antimony in the form of Dover's powder, as already suggested, or to the syrup of ipecacuanha and spirit of nitrous ether, in a liquid form; or, when the cough is particularly troublesome at night, as often happens, it can be given with more advantage in a single dose, or two doses in the evening. The preparations we have found most useful are, laudanum, especially the tr. opii deodorata, paregoric, solution of morphia, or Dover's powder. Under six months of age, half a drop of laudanum, from five to ten drops of paregoric, or two or three drops of the solution of morphia, may be given, and repeated twice or three times in the twenty-four hours, according to the effects. From the age of six months to the end of the second year, these doses may be doubled. In the third and fourth years, two drops of laudanum, ten to twenty of paregoric, five to ten of solution of morphia, may be used several times a day. Where the remedy is given every two or three hours, we have found one drop of laudanum quite enough at the ages last mentioned. When the dose is given only at night, from three to five drops of laudanum, ten to fifteen of solution of morphia, and thirty to fifty of paregoric are sufficient as a general rule. After the age of four and five years, the doses must be increased in proportion to the age. In very young children, the doses given at first should always be watched with a good deal of care, and never carried to such a quantity, or continued long enough, to induce constant and heavy drowsiness or stupor. In some instances of very nervous and hyperæsthetic children, in whom there is determined, by the violence of the reaction, a degree of irritability of the nervou centres tending to the tetanic state, the doses must be much larger than those mentioned; but here the physician should see the patient himsel at least twice, and sometimes three times in the day, to watch an regulate by the dose the exact action of the drug. We have occasionally seen the cough most harassing and exhausting in its effect, occurring almost with every breath, and lasting for twelve and twenty-four hours. Under such circumstances, a mixture like the following has proved most beneficial in our hands:

℞. Tr Opii Deodorat.,	gtt. xxxij.
Vin. Antimon.,	gtt. xxxij.
Ext. Valerian. Fl.,	fʒij.
Syrup. Simp.,	fʒij.
Aquæ,	f℥iss.—M.

Dose, a teaspoonful every hour or two hours, at the age of four years and upwards, until the cough is controlled.

Paregoric, in the proportion of two drachms to half an ounce, in place of the laudanum, sometimes proves more soothing and comforting.

General Management.—Since the reign of restorative medicine has set in, the general management of the patient has received a degree of attention which it had never attracted before. Under the expectant plan it constitutes, indeed, the chief portion of the treatment. The most important points to be attended to under this head are the diet, drinks, clothing, air, and state of repose.

The patient ought not to be allowed to go entirely without food even in the early days of the disease, neither should there be any effort made to stuff the child with large quantities of nourishment. The appetite is nearly always in great measure abolished, at first, and food is unwillingly taken except in very small quantities. A nursing child must not be allowed to nurse as heartily as usual. If it attempts to do so, it is probably from thirst and not from hunger. Water, therefore, should be offered to it from time to time, and the breast be allowed only every three or four hours for short periods. Weaned children should have only milk, always reduced by the addition of half or a third water, and pure water ought to be given frequently. The thirst in this disease is intense, and the physician should himself see that the patient has water freely. We have seen the most violent and obstinate screaming, and painful restlessness, quieted at once by a copious draught of cold water. In children over two and three years of age, milk and water is still the best food; but when this is refused, thin chicken or beef tea may be given in doses of a wineglassful or a gill every four hours. After three or four days have passed by, the administration of food is a very important part of the treatment. The child should now be induced, by persuasion and even gentle force, to take a little food at least three or four times in the twenty-four hours. As the severity of the symptoms subsides, the food ought to be increased in quantity.

The clothing ought to be such as to keep the body comfortably warm. In winter, which is the season when the disease almost always occurs, thin and soft flannels ought to be worn, and, when the child is very restless, either in the bed or on the lap, a sack made high in the neck, with the sleeves to the wrists, buttoning in front, and consisting of a soft and pliable woollen stuff, ought to be put over the bed-dress.

The room ought to be, if possible, a large one with a high ceiling, well ventilated, warmed by an open fire, and kept at a temperature of 65° to 68°. If the child is very young and delicate, a temperature of 70° is not too high, if only the ventilation be good.

The bed or crib is the proper place for a child with pneumonia. The lap of the mother or nurse is a poor substitute for an even, elastic, and steady mattress. We have long endeavored to keep our little patients in bed. A very young infant must of course often be taken up to be nursed, soothed, or cleansed, but, as soon as possible, it ought to be replaced in the crib. Children a year or two old can generally, with good management, be kept the greater part of the time in bed. Those of three and four years old and upwards ought always to be confined to the bed. A little firmness on the part of the mother will almost always accomplish this end, and it is a highly important one, and well worth even a quarrel at the beginning of the sickness. We have seen a child three years old kept by a weak and overtender mother and grandmother nursed on the lap for three weeks, until they were exhausted and demoralized, and the child had œdematous feet from their dependent position during so long a time.

Repose and quiet of mind and body, as complete as can be attained, are things of great value, and to secure them a good bed and a cheerful and resolute manner on the part of the nurse are as important for the child as for the adult. It is only in bed, too, that an even temperature and an avoidance of draught can be fully secured. A direction given by some of the French writers, and by Dr. Gerhard, is not to allow very young children to lie for too long a time in one position in bed, or in the nurse's arms, as it is apt to produce a stasis of blood in the dependent portions of the lungs, and thus to maintain or increase the disease. Dr. West recommends, whenever the inflammation has reached an advanced stage, or involved a considerable extent of the lungs, that the patient be moved with great care and gentleness, lest, as he has often seen occur, convulsions be produced.

ARTICLE III.

BRONCHITIS.

Definition; Synonyms; Frequency; Forms.—The term bronchitis is now universally employed to express inflammation of the mucous membrane of the bronchia.

It is usually called in this country catarrh, and catarrhal fever. It has been stated, under the head of Pneumonia, that many of the cases known amongst us by the popular term catarrh-fever, are in fact, cases f pneumonia. We shall on account of this misapplication of names eneavor to draw the distinction between bronchitis and pneumonia with reat care.

Since bronchitis and pneumonia have been more carefully distinguished in the mortality returns of this city, bronchitis is found to be the cause of a much smaller proportion of deaths than would have formerly appeared.

Thus, during the seven years ending with 1869, the total mortality from all causes (excluding still-born children) was, at all ages, 105,785; under fifteen years of age, 50,151; and under five years, 43,322. The mortality from bronchitis during this period was, at all ages, 969, or less than 1 per cent. of the entire mortality; under fifteen years, 509, or 1.01 per cent. of the mortality under that age; and under five years, 495, or 1.14 per cent. of the mortality under that age.

It is, however, one of the most frequent of the diseases of childhood, especially during the winter and early spring months. It is said to be more common as a secondary than as an idiopathic disease. Of 115 cases observed by MM. Rilliet and Barthez, only 21 were idiopathic. Of 123 cases, however, that we have recorded, 76 were primary, and the remaining 47 secondary. The diseases during the course of which it is most apt to occur, are pertussis and measles.

We shall describe three forms of the disease: 1, *acute bronchitis* of moderate severity; 2, *acute suffocative bronchitis*, or catarrhus suffocativus, the congestive catarrhal fever described by Eberle and by Dr. Joseph Parrish, of this city; 3, *subacute* or *chronic bronchitis.*

CAUSES.—Amongst the *predisposing* causes of the disease, *age* is one of the most important. MM. Rilliet and Barthez suppose it to be much more common in children over, than in those under five years of age. Of one hundred and fifteen cases observed by them, thirty-seven occurred between the ages of one and five years, and seventy-eight between six and fifteen years of age. It is scarcely fair, however, to compare a period of nine years with one of only four, as is done in the above statements. Of one hundred and twenty cases that we have seen in private practice, in which the age was noted, fifty-four occurred between birth and two years of age; thirty-nine between two and four years; twelve between four and six; six between six and ten; and three between ten and fifteen. Of eighty-one cases under four years of age, of which we have kept an accurate record, eleven occurred in the first half of the first year of life, twenty in the second half, making thirty-one for the first year; twenty-one occurred in the second year of life, nineteen in the third, and ten only in the fourth, showing that the liability it greatest in the first year of life, and particularly in the last half of that year, that it continues very strong in the second and third years, being nearly equal in each of these, and that it then suddenly diminishes. It would seem also that the simple acute, and the acute suffocative forms are most common under six years of age, while the secondary cases occur more frequently after that age.

As to the influence of *sex* on the liability to the disease, it would appear from our experience to be rather more common in girls than boys, since of ninety-nine cases in which this point was noted, fifty-four occurred in girls and forty-five in boys. The fact of its being more frequently a *secondary* than a *primary* affection has already been noticed, though this has not been true of our experience. The diseases in which the largest number of cases occur are measles, pertussis, and typhoid fever. The secondary cases are most common, of course, during the prevalence of the diseases whose progress they complicate, whilst the primary cases are most common in the cold months of the year, and especially in the autumn and spring. The reader is referred to the table in the article on pneumonia for a full exhibition of the effects of season and temperature upon the frequency of this disease. Bronchitis is sometimes *epidemic* amongst children as it is amongst adults. It is important also to be aware that there is a strong tendency to attacks of bronchitis in rickety children.

The only *exciting causes* whose effects in the production of the disease seem clearly proved are sudden transitions from a warm into a cold atmosphere, and sometimes the contrary change; prolonged exposure to cold, particularly when combined with moisture; and the inspiration of irritating gases. We believe ourselves, from what we have seen in this city during the last thirty years, that the most fruitful cause of bronchitis, and also of pneumonia, croup and angina in early life, is the style of dress almost universally used for young children. The dress is entirely insufficient. It consists usually of a small flannel shirt, cut very low in the neck, scarcely covering the shoulders, and without sleeves; of a flannel petticoat, a muslin petticoat, and an outer dress made in nearly every case of cotton. The dress, like the flannel shirt, is cut low in the neck, is without sleeves, and fits very loosely about the chest, so that not only are the whole neck, the shoulders, and the arms exposed to the air, but, in consequence of the looseness of the dress about the neck, it is fair to say that the upper half of the thorax is also without covering. In the infant, from birth to the age of six or eight months, the dress is made long, a wise provision so far as it goes, but from the time the skirts are shortened, up to the age of four or five years in boys, when happily the time for boys' clothes arrives, and throughout childhood in girls the trunk of the body and the arms are dressed, or rather left undressed, as above described. But, not only are the neck, breast, and arms left bare, but in many children the greater part of the legs also is kept uncovered, or at least, short stockings, scarcely rising above the ankles, and muslin or sometimes Canton flannel drawers, not reaching, or scarcely reaching to the knees, leave exposed to the air a large proportion of the cutaneous surface of the lower extremities. Now, in this dress, the child passes the day in a house, the sitting-rooms of which are heated usually to 68° or 70°, but in which the entries, and sometimes the parlors, are frequently at a temperature of 60°, 50°, or even lower, as we ourselves have tested with the thermometer. And not only are the entries and parlors, and indeed all the rooms, saving the one or two in constant use, frequently at the temperature just mentioned, but the air of the nursery itself is often allowed, through the negligence of the servants, and especially early in the morning, to fall to 60° or 58°, or possibly lower still.

That this style of clothing is not correct, is proved by the simple facts that children who are dressed nearly the same in summer as in winter, suffer scarcely at all from colds in the summer season, when the thermometer seldom ranges below 76°, and is usually above that point; and also by the fact that adults have been driven by long and almost forgotten experience, to wear clothing twice or three times as warm as that which they put upon their children. How constantly do we see the strong and fully-developed man comfortably enveloped in a warm, long-sleeved flannel shirt, woollen or thick cotton drawers, and cloth pantaloons, vest, and coat, in the same room and in the same temperature with the little—often puny, pale, and half-naked—child. But it is almost impossible to make people understand that children need as much clothing as themselves. They always insist upon it that, as the child passes the greater part of the day in the house, it cannot require as much clothing as the adult who is obliged to go out and face the weather; forgetting, or refusing to see, that the former wears less than half, or probably not more than a fourth, as much covering as the latter, and that the adult, when in the house, and in the same rooms as the child finds his one-half or three-fourths warmer clothing not at all superabundant or oppressive.

We have repeatedly had patients to get well of chronic catarrhal and laryngeal coughs, and to cease to have, as before, frequent recurrences of these disorders, under the simple treatment of a long-sleeved and high-necked merino or flannel shirt; long woollen stockings, and stout Canton flannel drawers coming down below the knees; and that, too, after the most patient and assiduous, and sometimes over assiduous trials of drugs, diet, and confinement to the house, had entirely failed of any permanent good effects. The fact is, that though there are some few children who can bear the dress above-described without injury, there are a great many more who, while they wear it, either suffer all winter long from frequently repeated attacks of cold, in the shape of croup, chronic laryngeal irritation with cough, chronic pharyngitis, bronchitis, acute or chronic, or more rarely pneumonia; or, if they escape these direct effects, resulting from the constant and rapid waste of their caloric, they are rendered more pale, thin and delicate-looking than they would be were their vital forces husbanded by warm clothing, instead of being wasted in the constant struggle to keep up the heat of the uncovered body at the natural point.

Anatomical Lesions.—We shall describe, first, the lesions met with in cases in which the disease is confined to the larger bronchia, the inflammation not extending into the capillary tubes; and next, those observed in cases in which the disease has attacked the capillary bronchia. The former are those which constitute the form designated under the title of acute ordinary bronchitis of moderate severity, while the latter are those to which the term capillary has been applied. Patients seldom die of the first-named variety of the disease alone, but as it often occurs as an accidental complication, or a more or less essential part of different severe and frequently fatal diseases, the morbid alterations which characterize it, have been very thoroughly studied and ascertained.

The morbid alterations of *acute ordinary bronchitis* always exist in both lungs, and are confined to the larger bronchia, ceasing on a line with the smaller tubes and the capillary divisions. The most constant alteration is redness of the bronchial mucous membrane, caused by injection of the minute vessels of that and the subjacent tissues, and varying in shade from a rosy to a bright-red or brownish tint. The mucous membrane is sometimes softened, a change which can be ascertained only in the largest tubes, and it sometimes presents a thickened, unequal, and rough appearance. Ulcerations are very rare. The inflamed bronchia contain a more or less abundant viscid, transparent, or opaque yellowish mucus.

In *capillary bronchitis* the alterations of the mucous membrane of the capillary tubes, do not always reveal the existence of the disease. That membrane is sometimes pale in the minute ramifications, and exhibits morbid changes only in those of medium size. The alterations of the membrane consist in redness, which is made up either of a number of fine points, seated in the membrane itself, or of arborizations seated both in the membrane and the cellular tissue beneath; it sometimes presents a granulated appearance, and it may be more or less thickened, and its consistence diminished. The bronchia are usually filled and almost obliterated from the secondary divisions to the final ramifications, by a substance of a yellowish-white or yellow color, non-aerated, and composed of a thick muco-pus. Portions of false membrane are sometimes, not as a rule, but exceptionally, found mixed with the secretions just described, while in other instances false membranes alone are present in certain tubes. The false membrane may exist in the form of patches, or it may constitute a lining to the whole extent of the bronchial ramifications. It is usually soft and but slightly adherent, and the mucous membrane beneath is either very pale and of its usual consistence, or red, softened, and rough. The different kinds of secretion are commonly most abundant in the bronchia of the inferior lobes.

In a good many of the cases, another lesion, dilatation of the bronchia, is also found upon examination. This alteration evidently occurs under the influence of the inflammation; it may affect either the length of the air-tubes, or only their extremities. In the former condition the tube continues of the same size, or becomes gradually larger from one of its early subdivisions, until it reaches the surface of the lung. In the latter condition a section of the lung presents an areolar appearance, from the presence of a multitude of little rounded cavities, communicating with each other and with the bronchia, of which they seem to be a continuation. These cavities are generally central, though they are sometimes found upon the surface of the lung, in which case they are formed of the pleura, lined by the thinned membranes of the dilated bronchus.

The fact of these cavities being true dilatations of the bronchia, has been called in question by Dr. Gairdner (*loc. cit.*, p. 76), who believes, on the contrary, "that almost all the so-called bronchial dilatations, and all of those presenting the abrupt, sacculated character here alluded to, are in fact the result of *ulcerative excavations* of the lung communicating with the bronchia." He supposes them to be the result of the expansion of certain small cavities, frequently met with in the bronchitis of children, and to be described directly under the title of vacuoles or bronchial abscesses, either by ulceration or by the act of inspiration.

In addition to the lesions already described as existing in bronchitis, there is another one, not unfrequently met with, to which we shall call attention, that to which the French writers apply the term *vacuoles*, and which Dr. Gairdner designates as *bronchial abscess*. The latter author states that in the centre of the collapsed lobules of a lung affected with acute bronchitis, there are found, not unfrequently, small collections of pus, varying in size from that of a hemp-seed to double or treble that volume. "These small abscesses present, on section, an appearance so much like that of softening tubercles, as to be very readily mistaken by many persons for these bodies; and the resemblance is all the greater on account of the peculiar limited form of the condensation by which they are generally surrounded, which, when felt by the touch from the exterior of the lung, is exceedingly deceptive. In their interior, however, these little abscesses contain, in the recent state, a very fluid pus; moreover, they are often met with as acute lesions produced by a few days of illness, and without a trace of tubercle in any other organ." When the pus is scraped or pressed out of these abscesses, in their recent form, they are found to be lined with a fine villous membrane, while in other instances they are not abruptly limited, but the pus appears to lie in contact with the surrounding pulmonary tissue. The bronchia leading to the part of the lung thus affected, are found, when incised, to be much inflamed, their mucous membrane being vascular, thickened, and covered with pus; and some of them can be observed to communicate with the purulent collections, the mucous membrane having been, at the point of communication, destroyed by ulceration, and either stopping short abruptly, or becoming gradually incorporated with the false membrane lining the abscess. Sometimes these abscesses or vacuoles communicate not only with the bronchia, but also with each other, without difficulty; sometimes, according to Dr. Gairdner, they break into one another and form more considerable excavations, but, more commonly, they remain of limited size, preserving perfectly the direction and relations of the bronchial tubes. They occur both in the diffused and lobular form of condensation from collapse of the lung, and both forms may sometimes be seen in the same lung.

The alteration just now described has excited a good deal of discussion amongst medical writers, and has been very differently accounted for. MM. Rilliet and Barthez regard it as a simple terminal dilatation of the bronchia, while MM. Barrier, and Legendre and Bailly, conside it to depend on a purulent breaking down of the vesicles of one or mor lobules. MM. Hardy and Behier look upon it as a lesion of a comple nature, partaking both of dilatation of the bronchia and of pulmonar emphysema. Dr. Gairdner, as already mentioned, describes them a abscesses, and states that they "unquestionably arise from the accumu lation of pus primarily in the extreme bronchial tubes of the collapsed lobules." This view, which is closely similar to that of MM. Barrier, and Legendre and Bailly, is, it appears to us, much the most reasonable that has been adduced.

MM. Rilliet and Barthez, in their second edition, as has already been stated, in the article on post-natal collapse, describe at great length a state of *congestion* of the lung-tissue, as a most important element in the anatomical alterations of the bronchitic diseases. This congestion usually assumes one of two forms: it may be distinctly lobular, consisting then of disseminated patches, or, as more generally happens, large numbers of contiguous lobules are affected, when it takes the form of generalized lobular congestion. These congested portions of the lung are almost always attended with more or less well-marked collapse of the vesicles, so that there is associated together the conditions of congestion and collapse. It is this combination of bronchitis, with congestion and collapse, which was formerly described by them, under the titles of lobular and generalized lobular pneumonia. The alteration to which the term carnification has been applied, and which not unfrequently coexists with bronchitis, they regard as different from the above, and as consisting in a simple collapse of the lung-tissue, without the active or passive congestion which exists in the first form. The principal causes of this condition are, according to them, debility and catarrh. The signs of catarrhal inflammation are, they state, never scarcely absent. In only four out of thirty-one cases did they fail to discover them.

The parenchyma of the lung presents, in bronchitis, different appearances in different cases. It is supple, crepitant, and of a rose-gray color, but does not collapse, especially the anterior portions, when the thorax is opened, as does healthy lung. This imperfect collapse depends either on the fact that the thick mucus and muco-pus which fill and obstruct the bronchia, prevent the contained air from being expelled by the natural elasticity of the lung, or, when no secretions exist to produce this effect, on the loss of the natural elasticity of the organ. Another cause is the existence of vesicular emphysema, a lesion observed to a greater or less extent in nearly all the cases, and affecting usually the summit of the lung, its anterior edge, and also its posterior or lateral edge In a large number of cases, and particularly in those occurring in youn children and in weakly and debilitated subjects of all ages, the tissu surrounding the diseased bronchia exhibits the condition which ha already been fully described in the article on atelectasis, under the titl of collapse of the lung. The extent and mode of distribution of thi lesion, its peculiar and distinguishing characters, its causes and mode production, and the method of treating it, have been carefully discussed in the article just referred to, and we shall make no further allusion to it, in this place, except to beg the reader, who is not already fully acquainted with it in all its bearings, not to suppose himself master of the subject of bronchitis until he has also fully studied that of collapse, as the two go together so constantly, and the latter is practically so important, especially in children, as to make it essential for him to understand both.

The lesions just described as characteristic of acute bronchitis, are also met with in the *chronic* form of the disease. The dilatation of the air-tubes, however, presents different features. The calibre of the enlarged tube is often much greater, its walls are whitish and uneven, and cry under the scalpel, and beneath the mucous lining may be seen hypertrophied transverse fibres. The mucous membrane itself remains smooth and polished, while the tissues beneath are thickened and hypertrophied.

SYMPTOMS; COURSE OF THE DISEASE; DURATION.—Acute simple bronchitis exhibits very different degrees of severity in different cases, being in some extremely mild and benign, and in others so much more severe, as to border closely on the capillary form of the disease. In its mildest form, it occasions merely slight cough and stuffing, a little mucous râle over the larger bronchia, with a total absence of dyspnœa, or of decided fever. In cases rather more severe than this, it begins with a moderately frequent cough, which, dry at first, soon becomes loose, and is neither paroxysmal nor painful. The expression of the face remains natural, with the exception of an appearance of slight languor. The pulse and respiration are but slightly accelerated; the external phenomena of the latter, an important means of diagnosis in infants, remain natural; it occurs without jerking, the rhythm continues even and regular, and there is no violent action of the alæ nasi. The percussion is not modified. Auscultation reveals in very young children a mixture of mucous and sibilant râles on both sides, which come and go, and are of short duration; in older children, the moist râles predominate, and commonly last several days. These sounds are seated in the larger bronchia. The temper of the child is not much changed; the appetite is not entirely lost; there is neither vomiting nor diarrhœa; and the fever is usually slight. The disease remains nearly stationary, or increases for a variable length of time, after which the cough becomes looser, and in children over five years of age, is sometimes attended with expectoration of frothy or yellowish mucous sputa, whilst under that age there is no expectoration. The fever and other symptoms, with the exception of the cough, now subside; the cough remains some days longer.

In attacks still more severe than this, the symptoms resemble very much those just now described, but they are all more intense. The cough is tighter, more frequent, harassing, and especially it is more painful, as shown by the fact that the child cries and complains, and that a marked expression of pain passes over the face at the instant of coughing. There is more fever, the skin being hot and dry, and the pulse more frequent, rising often to 130 or 140, and in one case to 156. The respiration is hurried, and though not attended with the same labor and anxiety as in the capillary variety, it is evidently oppressed; it counted in three cases, 60, 60, and 62. The temperature is considerably elevated, but not so much so as in pneumonia, rarely rising above 102° or 102.5°. There is more restlessness, fretfulness, and general distress; the appetite is greatly diminished or lost, and infants nurse with less avidity than usual, or refuse to nurse at all for several hours together. In cases of this kind, the physical signs are more decided than in those of milder degree, there being a greater abundance of mucous and dry râles, and generally some subcrepitant râle, and they are heard over a larger extent of surface, usually over the lower half, two-thirds, or even the whole dorsum of the chest. The symptoms are almost always most marked and severe in the after-part of the day and night. Very often the patient will be comparatively easy and comfortable in the morning, but as the day goes on, he becomes more feverish, restless, and fretful; the cough grows more troublesome, more frequent, and tighter; the breathing is quicker and more oppressed; the face is more flushed; the sleep is broken and disturbed, and the child may appear through the night quite ill; and yet as morning approaches, the symptoms moderate, the skin often softens and becomes moist, and the whole aspect of the case shows a great amelioration in the manifestations of the disease.

According to Handfield Jones, this almost invariable tendency to aggravation of catarrhal disorders during the night is due to a lowering of the nerve-power, the vaso-motor nerves partaking of the general debility, and thus allowing dilatation of the arteries, and causing increased hyperæmia of the affected parts with more abundant exudation.

The *duration* of this form of bronchitis is very uncertain; the idiopathic cases last usually from four to seven or eight days, though they may last from sixteen to twenty-five; the duration of the secondary cases depends, in great measure, on the nature of the diseases during which they occur.

In any of these different degrees of acute simple bronchitis, the patient is liable, especially if it be a weak and debilitated child, or a young infant, to sudden and alarming aggravations of the symptoms. The breathing becomes suddenly either greatly increased in frequency, or excessively labored and oppressed, the surface becomes pale, the expression dull and languid, or distressed, the child is drowsy and inattentive, or uneasy and restless, the hands and feet are coolish, the act of sucking is performed with difficulty, or the child refuses the breast entirely, and it is evident that, from some sudden change in the condition of the lungs, the act of respiration and the aeration of the blood are very seriously interfered with. If this sudden aggravation of the symptoms be unattended with a corresponding increase of the febrile phenomena, as marked by greater heat of skin and augmented action of the circulation, it is altogether probable that it depends on a collapse of larger or smaller portions of the pulmonary texture, and if, on examination, we discover dulness on percussion, distant bronchial respiration, and cessation or greatly diminished abundance of the bronchitic râles, over parts of the chest where a few hours or a day before there had existed all the physical signs of bronchitis, there can be no longer any doubt as to the cause of the suddenly increased severity of the symptoms,—it must be owing to collapse.

Acute suffocative bronchitis, or capillary bronchitis, may succeed to the form just described, or appear as an idiopathic affection. Under either condition the general symptoms are more threatening than in the preceding form, and the disease soon assumes all the appearances of great severity. The child is very uneasy and restless, constantly changing its position, moving about in the crib or bed, or insisting upon being changed from the bed to the lap, or from the lap to the bed. In one case that came under our charge the oppression was very great, and the only position in which the child was at all satisfied was resting on the mother's arms, with the front of its chest applied against her breast, and the head hanging over her shoulder. The expression of the face is anxious and disturbed, and its color usually pale or slightly bluish. The temper is irritable or subdued; the child hates to be disturbed, and generally chooses its own position. The respiration is very much accelerated, running up in a very short time to 60, 70, or 80, and is usually more or less irregular, and evidently laborious and difficult. The cough is very frequent, troublesome, and evidently painful; it occurs in short paroxysms usually, with or without stridulous sound, is at first dry, and after a few days is accompanied, in older children, by whitish or yellowish expectoration. In some instances, the sputa consist of mucus tinged with blood, or of pure blood even, and still more rarely of mucus mingled with small shreds of false membrane. The appetite is entirely lost; the tongue is usually moist and furred white; there is acute thirst, and yet, in severe cases, though the presence of acute thirst is evident from the manner of the child, only very small quantities of water are taken, from the impossibility of suspending the respiration long enough to allow of more being swallowed; the drink is gulped rapidly, suddenly, and with great difficulty, and after a time is refused almost entirely from this cause. In children old enough to talk, the speech is short and abrupt; the patient dislikes to speak, from the fact that the effort obliges him to suspend momentarily the act of breathing. Fever sets in from an early period; the skin is hot and dry, and the face is flushed at first, though it soon becomes pale in most cases, from the approach of an asphyctic state. The pulse becomes frequent, rising soon after the onset to 130, 140, 150, or higher; it is full and hard early in the attack. The resonance on percussion is not modified. Auscultation reveals at first sibilant râle mixed with some mucous râles; but soon a fine subcrepitant râle is heard over all the lower parts of both lungs behind, and approaching sometimes, over the bases of the lungs, the character of crepitus. After a time the subcrepitant râle is heard over the whole, or nearly the whole dorsum of the chest, and to a greater or less extent, though not so well marked as behind, over the anterior regions of the thorax. This râle is audible at first both in inspiration and expiration, and is very distinct, but at a later period, it is heard only in the inspiration, or there is substituted for it a mucous râle, while the subcrepitant râle is now heard only in the forced inspirations during coughing or crying. These râles are fugitive and irregular, disappearing or changing from one to the other after fits of coughing.

Should the case not take a favorable turn, which change would be indicated by a moderation in the symptoms just detailed, and especially by easier and fuller respiration, with diminution of the amount of the subcrepitant râle, and return of the natural respiratory murmur over some parts of the chest, the symptoms look still more alarming. The oppression becomes excessive; fits of dyspnœa occur, in which the child is extremely restless and distressed, tossing itself about on the bed; the respiration runs up to 80, 90, or more, in the minute, and is attended with violent action of the alæ nasi; the pulse grows more and more frequent, rising to 150 or 180, and it loses force and volume; and the face assumes a whitish or slightly bluish tint, looks puffed, and is sometimes covered with perspiration. As the fatal termination approaches more nearly, the pulse becomes small, thready, and irregular; the respiration is uneven, irregular, stertorous, and often slower than before; the cough is smothered and less frequent; the restlessness generally diminishes, and the child sinks into quiet, and often becomes comatose: the paroxysms of suffocation are less frequently renewed, and less violent, and death occurs in a state of quiet insensibility, or is preceded by partial or general convulsive movements.

The *duration* of this form may be stated to be, on the average, between five and eight days. It may, however, end fatally in a much shorter time. In an example that we saw, in a child four months and a half old, death occurred in twenty-six hours from the onset. Dr. Eberle states that it seldom lasts longer than two or three days, and that in very young infants death sometimes occurs on the first day. M. Bouchut gives us the duration in children at the breast, from two days to a week. Dr. West mentions a case that proved fatal in less than forty-eight hours. In the favorable cases that we have seen the duration was seven, eight, and ten days.

Subacute and chronic bronchitis generally follows one of the acute forms of the disease. The character and severity of the symptoms vary very much in different cases. We have known some children to present for several months together, in the winter season, slight bronchitic symptoms, consisting in wheezing and somewhat accelerated breathing; cough, more or less frequent; occasional feverishness, especially at night; some diminution of appetite and loss of flesh; and sibilant and sonorous with mucous râles, heard here and there, but still without severe symptoms during the greater part of the time. Children laboring under this kind of bronchitic irritation are liable to, and generally have, from time to time, more or less sharp attacks of acute bronchitis, in which they present the usual symptoms of that form of the disease. These attacks are very apt to occur coincidently with changes in the weather, and in some patients the liability to them is so great, from the excessive susceptibility of the system to the weather, that no care will prevent them. In some instances, we are very sure that an aggravation of the symptoms of the chronic form constantly occurs whenever the child is about cutting additional teeth, whilst in the intervals between the appearance of the successive teeth, the child remains comparatively well. We believe that the cause of the aggravation, at the moment of cutting the teeth, is to be looked for, not only in the act of dentition itself, but in the circumstance that the liability to cold is greatly increased at that particular moment, probably because the forces of the system are so weakened by the effort of the dentition as to lessen the power of resistance against the disturbing influence of a changing, and particularly of a falling temperature.

Cases of the mild kind of chronic bronchitis that we have just been describing, usually get well under proper medical, and especially under proper hygienic means, after several weeks or two or three months; while in other instances the disorder continues, in spite of every precaution, throughout the winter and spring, and only ceases as the warm summer months arrive. We have known the same disposition to show itself again in the following winter. In other instances again, the frequent attacks of severe bronchitis, together with the effect of a constant slight bronchitic inflammation, ends in the production of an emphysematous state of parts of the lung, and the child exhibits more or less marked asthmatic symptoms, which show themselves whenever a slight increase of the bronchitis occurs, and whenever the digestive system is deranged by imprudence in diet or other causes. It is particularly in such cases as these that the bronchial affection is apt to be associated with rickets, and we should, therefore, always carefully search for the evidences of this latter disease.

In other examples of chronic bronchitis the symptoms are much more severe. These cases almost always follow an acute attack of the disease. The frequency of the respiration and the attacks of dyspnœa persist; the cough is loose and paroxysmal, and the pulse frequent and small; evening exacerbations of fever take place, and the face and sometimes the rest of the surface are often covered with perspiration. Auscultation reveals tubal blowing, with mucous or loud sonorous râles, which seem to indicate the presence of dilatation of the bronchia. Emaciation makes rapid progress, the face is pale and blanched, the eyes sunken, the nostrils are covered with mucous or bloody crusts, and the lips ulcerated. Strength diminishes progressively; the appetite is lost, and the thirst acute; colliquative diarrhœa appears; and after twenty, forty, or more days, the child perishes in the last stage of marasmus. This form of bronchitis often simulates phthisis very closely, and may last for a long time, even several years.

It rarely occurs under the age of five years. The expectoration consists of purulent or pseudo-membranous secretions in variable quantity.

PARTICULAR SYMPTOMS—PHYSICAL SIGNS.—The *dry râles* are amongst the most frequent alterations of the respiratory sound in bronchitis. They may be sibilant or sonorous; they seldom exist alone, but are accompanied with mucous râles, and diminish as the latter become more abundant. As the dry râles cease to be heard, they are replaced by mucous or subcrepitant râles, or by feebleness of the respiratory murmur. The sibilant râle is often heard over the whole thorax, though it may be confined to the posterior portions. It is not restricted to cases of inflammation of the larger bronchia only, but is also present in capillary bronchitis.

Moist Râles.—Mucous and subcrepitant râles do not exist in all cases without exception, as they may be absent in such as are very mild. They may generally be heard over both sides behind, more rarely over the whole of the chest, and almost always both in inspiration and expiration. They are generally persistent, but are sometimes suspended for a moment and replaced by sibilant râle or feeble respiratory sound. Their duration is in proportion to that of the disease.

Feeble respiratory murmur is sometimes observed. It is not permanent, occurs during the interruptions of the subcrepitant or sonorous râle, and does not occupy the whole extent of the thorax, but is limited; it is intermittent, and is not accompanied by diminished resonance.

When dilatation of the bronchia exists to a considerable extent it gives rise to bronchial or even cavernous respiration, and to bronchial resonance of the voice, cry, and cough. The bronchial respiration differs from that of pneumonia by its tone, and by its intermitting character. The *percussion* is generally sonorous.

It has already been stated in the account of the symptoms that it happens not unfrequently in severe bronchitis, and also in mild bronchitis occurring in debilitated children, that the respiratory sound suddenly becomes feeble, or even entirely suppressed, over parts of the lung, while in other instances a distant and imperfectly marked bronchial respiration takes the place of the natural vesicular murmur. These changes are heard either over small disseminated points of the lung, or over large surfaces; they are associated with more or less evident dulness on percussion, and what particularly characterizes them, they are very fugitive, being present at one examination, and absent perhaps at the next. The appearance of these changes in the phenomena afforded by auscultation, was formerly thought to indicate the occurrence of pneumonia, and especially of lobular pneumonia; they are now much more satisfactorily explained by the supposition that they depend on diffused or lobular collapse of the tissue of the lungs.

The physical signs above described are not invariably present in bronchitis. Cases do occur, though they are very rare, in which auscultation fails to reveal the characteristic signs of the disease.

RATIONAL SYMPTOMS.—The rational symptoms are of the utmost importance in informing us of the degree of severity of the attack.

Cough generally exists from the beginning, being in mild cases more r less frequent, and either dry or loose, while in severe cases it is frequent or very frequent, at first dry and then moist, and very rarely oarse. In acute capillary bronchitis, the cough has a peculiar character. From the first day it occurs in short paroxysms, lasting from a quarter to half a minute. The paroxysms vary greatly in violence, occur at irregular intervals, and generally continue without interruption to the fatal termination, though they are sometimes replaced by simple loose cough a few days before that event. The cough is rarely painful, so long as the inflammation remains simple. Expectoration is never present in very young children. When it occurs in those over five years of age, it consists, in the mild form, of a sero-mucous or of a frothy and yellowish mucous liquid. In general bronchitis it is sero-mucous at first, becoming after a few days yellowish and more or less viscous; it is sometimes nummular and sometimes amorphous.

In the capillary form, as already mentioned, the sputa consist of mucus tinged with blood, or of pure blood even, and in some rare cases there are mixed with the mucus, shreds of false membrane, which may present the form of casts of the minute ramifications of the bronchial tubes.

The *respiration* varies in its characters according to the extent and violence of the disease. In mild cases, it is not much increased in frequency, being generally between 28 and 40 in the minute. In more violent cases, and particularly when the disease implicates the smaller bronchia, it becomes very frequent. The acceleration is slight in the beginning, but increases regularly as the case progresses; thus it may be 30 at first, and rise afterwards to 50, 60, 80, and even 90. When not very much quickened, it remains even and regular; when more so, it becomes somewhat laborious, and the movements of the chest are full and ample; in severe cases, attended with much dyspnœa, it is often irregular, or assumes the characters to which M. Bouchut has applied the term *expiratory*, that is, the order of the movements is inverted, each respiration beginning with the expiration, leaving a pause between the inspiration and expiration, instead of between the expiration and inspiration. In chronic bronchitis with copious purulent or pseudo-membranous expectoration, the dyspnœa is generally habitual.

Fever.—The fever is slight in mild cases, the pulse rising very little above its natural standard. The heat is not great, and the febrile movement usually subsides before the termination of the disease. In the grave or capillary form, on the contrary, the pulse is always frequent, and continues to increase in rapidity as the disease advances. It varies between 104, 120, 160, and in very violent cases, rises as high as 200. Early in the attack, it is vibrating, rather full and regular, whilst in fatal cases, it always becomes small, irregular, trembling, and unequal. The skin is generally hot in proportion to the activity of the pulse, except towards the termination, when the extremities often become cool. The temperature does not rise so rapidly nor reach so high a point as in pneumonia. Thus Roger gives as the highest temperature observed by himself in bronchitis 102.2°; while the average in his cases of th acute febrile form was 100.9°. The skin is almost always dry. In ver young children it is often pale and cold, and covered with perspiratio from the beginning.

The *expression* of the face is unchanged in mild cases, but when th disease is violent and extensive, becomes deeply altered after a fe days. The eyes are then surrounded by bluish rings, and the expressio is uneasy, anxious, and sometimes, but less frequently, exhibits an ap pearance of profound exhaustion. The anxiety of the countenance in creases with the oppression; the alæ nasi are dilated, the nostrils dr or incrusted, and the lips and face, which are extremely pale or momentarily congested, assume a purple tint, particularly after the paroxysm of cough.

The *decubitus* is indifferent at first, but as the disease progresses, the child lies with its thorax more or less elevated, or is restless and constantly changing its position.

In dangerous cases there is great *distress* and *restlessness* after the first few days, or even from the beginning. In some instances the irritability and peevishness are excessive and uncontrollable, while in others there is heaviness and somnolence, especially towards the termination of fatal cases. Some of the disorders of the nervous system just mentioned are present in all the grave cases.

Digestive Organs.—There is moderate *thirst* and incomplete *anorexia* when the disease is mild, but, when severe, the thirst is generally acute, and the appetite entirely lost. The state of the bowels varies. The *tongue* and *abdomen* present no special characters in idiopathic cases.

Urine.—The great majority of recorded observations of the condition of this excretion in bronchitis, relate to the disease as occurring in the adult. The following summary is taken from Parkes: the condition of the urine in bronchitis varies greatly with the grade of the disease; in the grave forms, it resembles that of pneumonia, the urea being increased, and the chloride of sodium at times entirely absent. The urine has also been quite frequently found to be temporarily albuminous in such cases.

Diagnosis.—The mild form of bronchitis, in which the inflammation is confined to the larger bronchia, is not likely to be mistaken for anything but the early stage of hooping-cough. The diagnosis can be made only by attention to the different characters of the cough, which is more spasmodic and paroxysmal in pertussis, by the absence of fever in that disease, and by the development of the peculiar symptoms of each, as the case progresses. The diagnosis between bronchitis and pneumonia is seldom difficult, except when the latter is grafted upon the former, or in cases of partial pneumonia, attended with bronchitis. In well-marked cases of the two diseases, there can be no difficulty. The restriction of the physical signs to one side alone of the chest in pneumonia, the peculiar crepitus of that disease, or when this is not heard, the fineness of the subcrepitant râle, limited to the upper or lower regions of one lung, the bronchial respiration and bronchophony, the dulness on percussion over the seat of disease, the greater sharpness and severity and the different location of the pain, the more acute character of the febrile reaction, as marked by the pulse, skin, and thirst, the more abrupt and higher elevation of temperature, and the kind of expectoration, when there is any, will always enable us to distinguish the two with almost absolute certainty. In cases, however, in which the two are combined, the diagnosis is not so easy, but even here the presence of dulness on percussion, and of crepitant or fine subcrepitant râle, or, when these are absent, of pure metallic bronchial respiration with bronchophony, over limited portions of the lung, will generally render the matter clear.

The *sudden* supervention of dulness on percussion over large portions of one of the lobes of a lung, or over disseminated patches, with feeble or absent respiratory sound, or with muffled and distant bronchial respiration, generally indicates the occurrence of collapse in the part of the lung over which these signs exist; and when these symptoms show themselves without any increase in the severity of the febrile reaction, but rather with a diminution, there is every reason to suppose that they depend, not upon inflammatory condensation of the parenchyma of the lung, but upon simple collapse, from the presence of obstructive secretions in the bronchia.

Dr. Gairdner (*loc. cit.*, p. 6) has called attention to a difference in the character of the dyspnœa in the two diseases, which is, we think, of considerable importance, and which we have often remarked ourselves. In bronchitis, of any considerable severity, the respiration is always evidently labored; it is performed only with the aid of all the accessory muscles of respiration, and in really severe cases it is extremely laborious, the inspiration being long-drawn, exhausting, and inadequate. The dyspnœa of *pure* pneumonia is, on the other hand, quite different. It is merely an "acceleration of the respiration, without any of the heaving or straining inspiration observed in bronchitis, or in cases where the two diseases are combined." Dr. Gairdner states that he has repeatedly seen patients affected with a great extent of pneumonia of both lungs, in whom the extreme lividity and rapid respiration, numbering fifty or sixty in the minute, showed infallibly the amount to which the function of the lung was interfered with, who, nevertheless, lay quietly in bed, breathing without any of the violent effort, or disposition to assume the erect posture, so constantly accompanying the more dangerous forms of bronchitis. In children these differences are even more marked than in adults.

Chronic bronchitis may be mistaken for tuberculosis of the lungs or of the bronchial glands. The distinction can be made only by careful study of the history of the case, and of the phenomena afforded by auscultation and percussion, which are detailed in our article on tuberculosis.

It is also important that we should not overlook the evidences of rachitis, which, as before stated, very often exist in children who are predisposed to attacks of bronchitis.

PROGNOSIS.—Bronchitis is rarely a fatal disease, so long as it rema confined to the larger bronchia, constituting the acute simple form, moderate severity. Capillary bronchitis is, on the contrary, a ve dangerous affection at all times and at all ages. Even ordinary, sim bronchitis, however, may prove fatal in young infants, and in debili ted children of all ages, from the supervention of collapse of portio of the pulmonary tissue; and it is necessary, therefore, that the pro nosis given should always be guarded, when the disease occurs und either of these two conditions. The prognosis differs also in the p mary and secondary forms of the disease, since, as might be expecte the danger is much greater in the latter than in the former variety.

We have met with a large number of cases of bronchitis, out of whi we have kept more or less copious notes of 123. Of these, 108 we mild, and 15 capillary. Of the 108 mild cases, 65 were primary, all which recovered; and 43 secondary, of which 2 died. Of the 15 cap lary cases, 11 were primary, of which one died, and four secondary, which 2 died. Of the whole number, 123 in all, 5 proved fatal. Th danger from the disease depends very much also upon the hygieni conditions in which the patients are placed. In hospitals and among the poor it is much more dangerous than in private practice among the easy classes of society. This is shown by the fact that all the case of the capillary form observed by MM. Rilliet and Barthez and Fauve in hospital practice, proved fatal, while of 15 cases seen by ourselve in private practice, under the most favorable hygienic conditions, onl 3 died.

The symptoms indicating great danger are, increase of the dyspnœ extreme anxiety, small and irregular pulse, coolness or coldness of th skin with clammy sweats, much jactitation, and delirium, drowsines or coma. With such symptoms the danger is greater and the fatal te mination more imminent in proportion as the child is younger, less ro bust, and its constitution exhausted by preceding or coincident disease

TREATMENT.—The acute simple form of bronchitis is frequently s mild as to need no other treatment than careful attention to the hyg enic condition of the patient, and the administration of some simple feb rifuge and expectorant. The child ought to be confined to one room in a mild and uniform temperature, and should be kept quiet until th development of the symptoms shows what is to be the type of the a tack. The degree of repose of the body necessary will depend on th presence or absence of fever. We believe that the practice of keepin the body quiet in all febrile disorders, is one of the most importan therapeutic means we have. It is long since one of us, having seen hi father insist upon putting children to bed for a feverish cold, began t follow the same practice. Time and experience have made even mor clear to us the wisdom of the practice, especially in regard to ver young children.

So soon as the attack of bronchitis becomes severe enough to caus fever, whether the fever be continuous or occur only in the afternoo and night, the patient ought to be confined to the lap or bed. Sucklin hildren, and those under three years of age, must be allowed to lie on the lap at times, but even they may be taught, very early, to rest quietly in the crib the greater part of the twenty-four hours. Children over three years old can almost always be taught to stay in their beds by a little management and authority, if only the parent is resolute. If not very sick, they should have a large pillow put up against the head of the crib or bed, and against this they should be placed in a sitting posture, with the bedclothes arranged over the lap; and, in cool or cold weather, with a light flannel sack over the night-dress. Here they ought to be kept all day, allowed to change their position as they wish, and they should be kept as cheerful and happy as possible with toys, books, pictures, readings, tale-telling, or what not. Under such circumstances, a new and interesting toy will often do more good by far than any drug in the materia medica. We have often been surprised, and delighted, too, to find a bronchitis which had been hanging over a young child for several days or a week, getting gradually worse, day by day, under the trotting-about system, begin to mend from the day the child was put to bed, and disappear in two or three days, and that, too, without any change in the other remedies.

The clothing ought to be warm, and yet not sufficient to produce free perspiration, as this, by sudden exposure and evaporation, often induces chilliness. The diet must be simple, and may consist of any of the milk preparations, with or without bread, or bread and butter. Light soups in the middle of the day, or roast potatoes or apples, with bread, may generally be allowed.

As for medicines, in this mild form they are of comparatively little consequence, if the above measures be carried out. In the after-part of the day, when fever sets in, we may prescribe a febrifuge of citrate of potash, such as the following, for children of two to four years old:

℞.—Potass. Citrat., ... ʒj.
Syrup. Ipecac., ... fʒj vel ʒij.
Tr. Opii Camph., ... fʒj vel ʒij.
Syrup. Simp., ... f℥ss.
Aquæ, ... ad f℥iij.—M.
A teaspoonful every two or three hours.

This should be given until the child sleeps, and occasionally in the night if there be cough and restlessness. At six months of age, the following may be used in the same manner:

℞.—Syrup. Ipecac.,
Tr. Opii Camph., āā . . . . fʒss.
Spts. Æther. Nitros., vel
Liq. Ammon. Acetat., ... fʒij.
Syrup. Simp., ... fʒv.
Aquæ, ... f℥ij.—M.
Give a teaspoonful every two hours.

If the fever is very slight, and the cough only moderately severe, it is often well to use no drug through the day, but to give in the evening, two hours before bedtime, and again at bedtime, some simple pectorant and anodyne. Thus at two or three months of age, three five drops of syrup of ipecacuanha with five of paregoric, or half a d to a drop of laudanum; at one or two years, ten drops of the syrup w ten to twenty of paregoric, or two of laudanum; at five to ten yea ten to twenty drops of the syrup, with twenty to thirty of paregoric five of laudanum. The laudanum is often better than paregoric, as produces a more decided and lasting impression on the nervous syste and appears to extend its useful control over the symptoms further in the following day.

In this very mild form there is no necessity for giving active purg tives. If the bowels are moved once in the day, or once in two day it is best not to interfere with them. If, however, the patient be co stipated, a little simple syrup of rhubarb, a teaspoonful of castor oil, an enema, will be quite sufficient. A warm foot-bath, in the evenin containing salt, or, better, mustard, will often assist in moderating t cough and promoting quiet sleep.

When, in this acute form, the symptoms assume greater severit when signs of reaction are prominent, the dyspnœa considerable, an the cough frequent and harassing, it was formerly quite the custom employ depletion. In a former edition of this work, it was stated th the abstraction of a few ounces of blood by leeching or cupping, wa allowable under these circumstances, but that a large majority of suc cases would do perfectly well without bloodletting of any kind. W now believe that such practice is unnecessary in any of this class cases. Attention to hygienic measures is, however, even more impo tant than in the milder cases. Confinement to the bed ought to be positive rule in such cases. If the bowels are not freely moved, a dos of castor oil, rhubarb, or magnesia should be given, and the patien then put upon the use of one of the febrifuge mixtures recommende above. When the fever is very high, and the patient over a year ol antimonial wine may be substituted, with advantage, for the syrup ipecacuanha.

If, as the case progresses, the bronchial secretions become ver abundant and the dyspnœa severe, the proper remedy is an emeti This may be ipecacuanha, either in powder or syrup, or a teaspoonf of powdered alum, to be repeated if necessary, in ten or fifteen minute The latter substance is, as we have stated under the head of croup, very certain, efficient, and safe emetic.

Great benefit may be obtained in all forms of bronchitis, from th more or less frequent application of mustard poultices to the front o back of the thorax, and from mustard foot-baths.

The mercurial preparations, so much recommended by many of th English and by some of our own writers, are, in our opinion, ver seldom, if ever, necessary in this, or indeed, in any of the forms bronchitis in children.

MM. Rilliet and Barthez recommend, when the cough and sibilar râle persist after the disappearance of the febrile symptoms, the use small doses of the flowers of sulphur. We have ourselves known this remedy to prove of service in such cases. About four grains may be given every three hours to a child four years old.

The treatment of the *grave acute* or *capillary form* of this disease brings up again the question of bloodletting. We, like all the rest of the world, have abandoned the practice as a rule, but we think that when, in a case of the kind now under consideration, the age being over two years, the oppression is very great, the right heart laboring, as shown by a congested surface and a throbbing cardiac impulse at the base and left edge of the sternum, and the strength not too much reduced, the abstraction of from two to four ounces of blood from the interscapular space by cups or leeches, would be a useful and legitimate practice. We venture to give this advice from our own past experience, and from the views taught quite lately as to the effect and value of depletion in relieving the overdistended right heart, produced by an obstacle to the pulmonic circulation.

There is no occasion for repeating here what has been said, under the head of pneumonia, in regard to tartar emetic. But if the temperature be very high, and the pulse full and strong, we believe that the small doses of sulphurated antimony (gr. $\frac{1}{12}$) we then recommended, in combination with Dover's powder, every two or three hours, are very useful in moderating the inflammatory symptoms. Should this be followed by nausea or vomiting with exhaustion, they must be suspended at once. The physician, and especially the young and inexperienced one, ought to know that the susceptibility to the action of all antimonials is singularly different in different individuals. We have seen a hearty adult woman thrown into a most violent, and for a time alarming choleraic condition, by two doses of $\frac{1}{12}$th of a grain of tartar emetic each. We saw once a fine hearty boy five years of age, vomit violently, grow pale, weak, and faint away, from two teaspoonfuls of the mel. scillæ compositum, containing in the two doses, the fourth of a grain of tartar emetic. And even twelfths of a grain of the sulphurated antimony will sometimes cause a degree of nausea and prostration in young children which ought not to be kept up, though we never saw it occasion such effects as those just mentioned as following the use of tartar emetic. When, therefore, the sulphurated antimony acts with any undue violence, it ought to be stopped, and we should substitute the citrate of potash mixture proposed for the mild form of bronchitis.

In connection with one of these internal remedies, counter-irritation to the surface of the chest will be found of very great service. Indeed, we doubt very much whether it is not the most important part of the treatment. It may be obtained by applications of dry cups to the back of the chest, or if this be inconvenient or objected to for any cause, by the use of mustard poultices. The poultice ought to be about the size of the hand, or one-half larger, and it should be made of one part mustard to two of Indian meal or flour. It is to be mixed with warm water, covered with book muslin or cambric, and applied first to the dorsum of the chest; after having reddened at that point, it should be shifted to veak decoction of seneka; or we may combine with the decoction of neka, in a suitable form, small doses of the muriate or carbonate of nmonia. Depletion is, in these cases, entirely contraindicated; we ay, however, with advantage apply a few small dry cups to the dorm of the chest in the interscapular space, or over the lower lobes of e lungs.

In the bronchitis of children it often becomes proper and necessary o make use of *stimulants*. In the suffocative form, when the sympoms assume the character described in the last paragraph, small doses f brandy or wine-whey may be administered alternately with the pirit of Mindererus, with great advantage. In milder cases, also, when a sudden increase of the dyspnœa occurs, especially in feeble and debilitated subjects, and when we may suppose, from the character of the rational and physical signs, that collapse of portions of the lung has taken place, it is best to abandon for the time all nauseating remedies, and to make use simply of brandy in doses of from five to twenty drops every half hour or hour, or of wine-whey in dessert or tablepoonful doses, and of counter-irritants, with very light fluid nourishment.

In cases where there is such marked debility, tonics are very useful, and good results may be obtained from the administration of quinia, which was strongly recommended a few years ago, in the form of capillary bronchitis occurring in tropical climates, by Dr. Cameron (*London Lancet*, November 9th, 1861).

In cases of this kind, we have used with great advantage of late years small doses of quinia, prepared as follows:

℞.—Quiniæ Sulphat.,	gr. vj.
Acid. Sulph. Dil.,	gtt. xij.
Syrup. Simp.,	f℥ss.
Aquæ,	f℥ijss.—M.

Give a teaspoonful every two hours, to children two or three years old.

In older children the proportion of quinia to the dose ought to be oubled. If this should sicken, as it will sometimes do by the disgust s bitterness produces, and the consequent resistance to the doses, it best to lay it aside after two or three trials, and to administer the inia in the form of powder mixed with a little extract of liquorice nd sugar, or to substitute the following:

℞.—Elix. Cinchon. Flav.,	fʒij.
Curacoa,	fʒij.
Acid Sulph. Dil.,	♏xij.
Aquæ,	f℥ijss.—M.

Dose, a teaspoonful every two hours.

The child ought to be laid on an inclined plane of pillows, and, with exception of turning it gently towards one side or the other, from e to time, it should be kept perfectly quiet. These directions are particularly important in very young children, as it is in them that debility and exhaustion of the muscular forces are apt to bring about the state of collapse just referred to.

As an example of the kind of case in which stimulants are useful, and to show also the dangerous effects which antimony sometimes produces, we will quote the following: A girl between seven and eight years old, was attacked while in good health with severe bronchitis. On the second day, when we were called, she was very much oppressed, the skin was hot and dry, the pulse rapid, and the surface pale. We ordered a cupping to the amount of four ounces, with some dry cups besides, over the back, and two drops of antimonial wine with ten drops of sweet spirit of nitre to be given every two hours. On the third day a blister was applied over the sternum. On the fourth day we found the child in the afternoon very pale, dozing or tossing about on the bed, and sometimes rising up on her hands and knees with a bewildered look; she was inattentive, so that it was almost impossible to catch her eye; the eyes were sunken, and the countenance was distressed and anxious; she moaned constantly and looked very ill; the skin was still hot; there was neither vomiting nor purging. The respiration was very much oppressed, and she coughed a good deal, though not so much as before. We suspended the antimony at once, and gave a teaspoonful of brandy in water, directing it to be repeated in three-quarters of an hour; after the second dose a teaspoonful was to be given in a wineglassful of milk and water every two hours throughout the night. On the following morning, the child looked better; she was less pale, and the eyes were not so excavated. The breathing was better. She was still very drowsy, but often waked partially with screaming and affright, and when awake took very little notice. The milk and brandy were continued every two hours. On the afternoon of this day, all the unpleasant symptoms had disappeared; there remained only those indicative of a slight bronchitis, and she was soon quite well. Now it seems to us exceedingly clear that, had the antimony been continued in this case, on account of the hot, dry skin, oppressed breathing, frequent cough, and from the absence of vomiting or purging, the child would have died.

The most important points in the treatment of *chronic cases,* are to insist upon a rigorous and persevering regulation of the hygienic conditions of the patient, and to make use of tonic, balsamic, and expectorant remedies. The child should be carefully and warmly clothed, and, when at home, kept in dry, well-ventilated, and, if possible, airy rooms, at a uniform temperature. The living room of such a child ought to be heated in winter by a wood-stove, or open wood-fire, if that is sufficient to keep up a proper temperature. In our cold winters we have found no plan so good as a well-managed wood-stove. Coal fires cannot be lowered or extinguished at night, as they ought to be, and often keep up, through the day, too high a temperature. They are unmanageable.

These, indeed, constitute the truly important part of the treatment, r without them, there is but little chance that drugs of any or of all nds, diet, or any other measures, will be of any real service. The ess and temperature ought to be the first things attended to, and ler them, and as a secondary matter, certain medical substances will ssist in removing the disease. The child ought to be taken as often s possible into the air in fine weather, and only in fine weather. The iet should be selected with a strict view to the improvement of the trength and vigor of the constitution; the food may consist, if the hild be of proper age, of light meats, of potatoes and rice, as the only vegetables, and unless there is some contraindicating circumstance, of a small quantity of wine with the midday meal. The best wine is port, of which one or two tablespoonfuls may be given in a considerable quantity of water.

Tonics must be administered throughout the course of the disease, or until the appetite and strength shall have improved to such an extent as to make them no longer necessary. The best are quinine, in the dose of a grain morning and evening, to be continued for several weeks; or, when the child is thin and anæmic, small doses of arsenic with iron, as recommended in the article on eczema, and cod-liver oil, in doses of half a teaspoonful to a teaspoonful, three times a day after meals, either pure or in some carefully-made emulsion, will often greatly assist in curing these chronic forms of catarrh.

In one case of chronic bronchitis, which came under our care, the patient recovered under careful regulation of the hygiene, and the use of a decoction of seneka, prepared by boiling a drachm, each, of seneka and liquorice roots, in a pint of water, to half a pint. The decoction was strained, and a large teaspoonful given three times a day. The remedy was continued during a period of two months; under its use the child grew fat and strong, and recovered entirely from the disease.

Other remedies, proposed by different authors, are the various resinous preparations, the balsams of tolu and copaiba, benzoin, and the sulphurous mineral waters. In cases of long-standing, where mucous râles persist throughout the lower part of the lungs, showing an abundant morbid secretion, tannic acid has been found, by several good authorities, of much service. While these means are employed, it is recommended, also, to make use of counter-irritants. If any are used, they ought to be such as will not produce too much inflammation of the skin; as, for instance, weak Burgundy pitch plasters, daily frictions with hartshorn and sweet oil, a simple diachylon plaster, or very mild pustulation with croton oil.

ARTICLE IV.

EMPHYSEMA.

Emphysema of the lungs is of quite frequent occurrence in children. It is much more generally met with in an acute form, developed during the progress of some pulmonary disease, than in the chronic form which it so often assumes in the adult. It is probable, however, that in many cases of asthma in childhood, there is an emphysematous condition of the lungs which has been gradually developed at an early period of infancy, in consequence of the respiratory embarrassment attending rachitic disease of the thorax. There is probably in such children a congenital delicacy and weakness of the lung-tissue, and subsequently, if the constitution is re-established, and the deformity of the thorax removed, as it frequently will be, there may be a restoration, to some extent, of the elasticity of the pulmonary tissue, with a corresponding decrease in the evidences of emphysema. It is also highly probable, judging from the frequency with which, in fatal cases of acute pulmonary disease in young children, more or less marked lesions of emphysema of the lungs are found, that this condition is frequently developed to a certain degree in the course of such cases which recover, and that subsequently the lung-tissue regains its normal state.

Anatomical Appearances.—The term emphysema of the lungs, is usually employed to include two conditions essentially dissimilar, and to only one of which it is in reality applicable. One of these is *vesicular* emphysema, which is dependent on dilatation or coalescence of the pulmonary air-cells, without any escape of air into the connective tissue of the lung, and which would, therefore, be more correctly called *rarefaction of lung-tissue*. The use of the term vesicular emphysema is, however, so universal and long-established, that it does not seem desirable to discard it. The other variety is *interlobular* or true emphysema, in which the air escapes from some point into the connective tissue of the lung, and dissects its way between the lobules and under the pleura.

In vesicular emphysema the portions of lung usually worst affected are the apex and the anterior border; it may, indeed, be limited to these parts, or may be present, in varying degrees of intensity, along the base and even over the entire surface of the organ. Usually it is present in both lungs simultaneously, though often much more highly developed on one side than the other.

The dilatation of the vesicles causes marked enlargement of the part affected, and when both lungs are seriously involved, they project forwards, occupying the mediastinal space, with their anterior borders closely approaching each other. The emphysematous portions do not collapse when the thorax is opened; they are pale, dry, and bloodless, and, when pressed with the finger, afford a soft, doughy feeling, with but an imperfect sense of crepitation. On examining the surface carefully, the dilated vesicles are clearly visible, forming clear, usually

d spaces as large as a pin's head or a millet-seed. The effect of
distension upon the surrounding viscera and upon the shape of the
ax are the same in kind, though not so great in degree, as are met
in the adult. The distended anterior portion of the left lung covers
e of the heart than normal, and tends to depress this organ down-
ds and to the right. In the same way when extensive emphysema
ie right lung is present, the liver is usually depressed. If both lungs
affected with marked and diffuse emphysema, the thorax is consid-
ly distended, the curve of the ribs is increased, while they are ele-
ed so that their course becomes more horizontal, and the thorax
omes shorter, deeper in its antero-posterior diameter, and more
nded.

he other variety of emphysema—really the only one which strictly
rits the name in its usual intention—is the *interlobular*. Here the
makes its escape from a rupture of some air-vesicle or minute bron-
ole into the connective tissue of the lung, and then readily makes its
y along the bronchial tubes between the lobules so as to reach the sur-
e of the lung. Here it presents itself in the form of minute bubbles
air, of rounded or elongated form, easily recognized by their paleness
d transparency, usually arranged in irregular, curving and branch-
g lines, and which can be proved to be in the interstices of the lobules
y the fact that they can readily be pressed by the finger from one
lace to another, or forced to coalesce. When these little bubbles are
hickly crowded together they produce an appearance well compared
by Rokitansky to froth. Associated with them are often found larger
bullæ, where the air has separated the pleura from the surface of the
lung; these form flattish, convex prominences above the surrounding
surface, and are freely movable. It will be understood that in inter-
lobular emphysema of the lungs, the size of the organ is comparatively
little affected, and consequently that little or no influence is exerted by
t upon adjacent viscera or upon the shape of the thorax. This condi-
tion is comparatively rare, and is not usually associated with marked
vesicular emphysema; indeed, the anatomical relations of the two forms
are not clearly understood. In cases where the pleura is stripped off
rom the lung over a considerable space, the membrane may be rup-
ured and air escape into the pleural cavity, constituting pneumotho-
ax, examples of which accident will be found in our article on this
atter affection. In other cases, the air makes its way along beneath
he pleura to the root of the lung, or by penetrating into the sub-
tance of the organ, and following up the divisions of the bronchi, it
eaches the same point. It may then pass into the mediastinal spaces,
here the loose connective tissue becomes highly emphysematous, so
s to present numerous large vesicles with delicate walls, altogether
esembling the appearances seen in animals in the slaughter-house.
rom the mediastinum the air readily passes upwards into the con-
ective tissue of the neck, where it may first produce a crepitant swell-
g in the suprasternal, supraclavicular, or inframaxillary regions; and
ay even extend thence over the surface of the trunk and extremities
as to produce general emphysema.

In the following interesting case, which has already appeared in print,[1] the subcutaneous emphysema did not extend below the clavicle. The minute perforation on the anterior surface of the upper lobe was perhaps due to the inflation of the lungs at the time of the examination, or may have occurred just before death. It would certainly have led to pneumothorax, had it been earlier present:

CASE.—*Acute Miliary Tuberculosis: Cough and Dyspnœa: Cervical Emphysema—Interlobular Emphysema—Interlobular Emphysema with Perforation of the Pleura: Emphysema of Mediastinum and Neck.*—John F. was born of a stout, hearty young woman, 17 years of age, who nursed him; and he seemed to thrive until eight days before his death, which took place January 24, 1868, at the age of four months. The symptoms during his sickness were dyspnœa, occasional dry, hacking cough, and anorexia. A few days before his death subcutaneous emphysema made its appearance over the lower part of the neck in front, spreading over both sides, and altering the entire contour of the neck, but not descending below the clavicles. The post-mortem examination was made fifteen hours after death.

The head was not examined. The subcutaneous emphysema persisted as above described.

On removing the sternum, the mediastinal spaces were found much distended with air, the meshes of the connective tissue in some spots forming vesicles more than one inch in diameter, and suggesting forcibly the appearances often seen in animals in the slaughter-house. The emphysema extended up along the trachea and larynx, and to a considerable distance on either side of the neck. There was not a trace of decomposition of the tissues. The lungs collapsed but slightly; the posterior portions were deeply congested, purplish, and almost non-crepitant, but expanded almost fully on inflation. There was neither pneumothorax nor pleuritic effusion or adhesions. The larynx, trachea, and lungs were removed, and inflated under water, when air was found to escape from the right lung in two places—on the anterior face of the upper lobe, and on the inner surface of the apex. On examining the rupture of the anterior surface of the upper lobe, the opening was found to be very small, and to be seated in the midst of a spot where the pleura was separated from the lung so as to form a large vesicle. There were other smaller pearl-like vesicles studding the surface of the lung. The apex was the seat of numerous miliary tubercles, both in the substance of the lung and immediately beneath the pleura. At one point on its inner aspect there was such a subpleural deposit, half an inch in diameter, which had undergone cheesy change, and in the centre of which there was an ulcerated opening in the pleura. The escape of air through this perforation was prevented by the close apposition of a tuberculous bronchial gland, about half an inch in diameter, which lay immediately on the right bronchus. The other bronchial glands, especially on the right side, were also tuberculous. The left lung presented no perforation of the pleura. At several points, especially along the anterior edge of the lung, there were large emphysematous bullæ, one inch long by half an inch wide, and in the neighborhood were numerous smaller vesicles of the same nature. On incising the lung near these, small clusters of gray miliary tubercles were found. Miliary tubercles were also found on the peritoneal investment of the liver and spleen, and in the substance of these organs and of the mesenteric glands. There were small irregular ulcers in the lower part of the ileum, and numerous small yellowish submucous deposits in the cæcum.

Causes.—Although the vesicular and interlobular forms of emphysema are anatomically quite distinct, they may advantageously be con-ered in connection with each other as regards the mode of their de- opment.

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[1] W. Pepper, On some Cases of Emphysema of the Neck. Philada. Med. Times, August 1, 1872.

Age.—Vesicular emphysema, though a frequent sequel of acute tho- cic diseases in children, cannot be regarded as a disease of childhood the same sense as the interlobular form. It is true that the delicacy the walls of the air-vesicles during early life would seem to favor the ccurrence of dilatation, but experience shows that it does not favor he development of emphysema nearly so strongly as does the gradual degeneration and weakening of the walls of the air-vesicles which comes on in advanced years.

Interlobular emphysema, on the other hand, is much more frequent in children, and reaches degrees of severity which are scarcely found in later life. So, too, the occurrence of subcutaneous emphysema, in consequence of the rupture of some minute bronchiole or air-vesicle, with the production of subpleural and then mediastinal emphysema, is an accident almost limited to early childhood, since of the recorded cases (about 25) in which it has occurred, four-fifths (20) have been observed in young children. Of these 20 cases of "general emphysema in children," to employ Roger's term[1] (of which 19 were collected by him, and 1 subsequently published by one of ourselves),[2] 6 occurred under the age of 2 years, 10 between 2 and 4, and only 4 between 10 and 15 years of age.

Previous Diseases.—In children, emphysema occurs as a sequel to some other disease, pulmonary or laryngeal. The affections which most strongly predispose to it are hooping-cough, the bronchitis of measles, simple bronchitis, pneumonia, and pseudo-membranous croup. Of all these, hooping-cough is by far the most fruitful cause. It will be observed that the diseases named present the common symptom of severe cough, often attended with impediment to the escape of air, either from spasm of the air-passages, or accumulation of secretion in the bronchi, or mechanical obstruction of the larynx by false membrane.

Mechanism or Mode of Production.—The way in which pulmonary emphysema is developed has been made the subject of frequent and conflicting speculation. Of the two chief theories which have been advanced in explanation, one (the *inspiratory*) regards the overdistension of the vesicles as the result of the excessive operation of the forces concerned in inspiration; the other (the *expiratory*) explains it as caused by violent but impeded expiratory efforts. The inspiratory theory is still upheld by some eminent writers, but clinical observation is leading to its abandonment. In its original form as advanced by Laennec, it was based upon the erroneous notion that the forces of inspiration are greater than those of expiration, and that consequently emphysema might result from mere excessive inflation of the lungs. This has, however, been universally abandoned as of general application, since the discovery of the important fact that in *forcible* breathing the power of expiration is considerably (at least one-third) greater than that of inspiration; though it is probable that in some morbid conditions of the pulmonary tissues, violent inspiration may of itself be capable of producing emphysematous distension of the air-vesicles.

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[1] Henri Roger, Archives de Médecine, 5ème ed., tome xx, pp. 129, 288, 403.

[2] W. Pepper (*loc. ante cit.*).

The form of the inspiratory theory, which is still retained by some authorities, is based upon modifications introduced by Dr. William Gairdner, and is an expansion of the idea that if certain portions of the lungs are, from collapse or other cause, incapable of expansion, the atmospheric pressure will determine excessive dilatation of the remaining portions, in order to prevent the occurrence of a vacuum as the thoracic walls expand. There are, however, such grave objections to this theory, which, it will be observed, rests upon the supposition that the expansion of the thorax and the amount of air inspired remain at the normal point, although portions of the lungs are collapsed or otherwise rendered unable to expand, that we are strongly inclined to regard the expiratory theory as the only one capable of general clinical application. We owe to Sir William Jenner chiefly the satisfactory refutation of the principal argument which was formerly brought against this latter theory, that "the expiratory act is mechanically incapable of producing distension of the lung, or of any part of it. The act of expiration tends entirely towards emptying the air-vesicles by the uniform pressure of the external parietes of the thorax upon the whole pulmonary surface; and even when the air-vesicles are maintained at their maximum or normal state of fulness by a closed glottis, any further distension of them is as much out of the question as would be the further distension of a bladder, blown up and tied at its neck, by hydrostatic or equalized pressure applied to its entire external surface" (Gairdner). A little consideration of the anatomical relations of the lungs to the thorax shows the falsity of this argument. The different portions of the lungs are in contact with surfaces and tissues of very different degrees of resisting power, and while the entire postero-lateral portions are supported by the unyielding ribs, the apices are covered only by soft tissues, and the anterior borders of the lungs are supported externally by the comparatively yielding costal cartilages, while centrally they are able to encroach considerably upon the tissues of the mediastinal spaces. In ordinary free expiration the air is forced out of the lungs by a pressure so moderate and gradual that even the weakest parts of the thoracic walls are sufficiently firm to maintain it. But when the expiratory efforts become more violent, the air is pressed with great force from the central, basic, and lateral portions by the ascent of the diaphragm and the compression of the thorax, while the outward current from the apices and anterior margins is comparatively feeble. If, therefore, from any cause the normal relation between the volume of the expiratory current of air and the calibre of the large bronchi be disturbed, the portion of air which cannot escape will be driven violently into the apices and anterior margins, not only overcoming the outward current of air proceeding from those portions of the lungs, but producing an excessive degree of distension of their air-cells. The strongest possible confirmation of the

this view is to be found in the fact that emphysema, both of
ular and interlobular form, is found to be developed in the
parts of the lungs in precise correspondence with the degree in
ey lack firm external support.

are two ways in which a disturbance of the above relations
effected: either by an obstruction in the air-passages, which
s the free escape of the air, or by the expiratory act being so
and violent that the volume of air hurriedly forced from the
les is too great to pass freely through the primary bronchi.
es of this latter condition are familiar to all in violent fits of
g, during which, even when there is no obstruction in the air-
s, the degree of distension of the apices may be appreciated by
ging of the supraclavicular tissues. The full pulmonary reso-
which is elicited by percussion of this bulging, proves conclu-
hat it is due to distension of the apex; and it is therefore easily
ood how the repeated operation of such a cause may gradually
the development of vesicular emphysema, or how in an abrupt,
and prolonged expiratory effort, attending a fit of coughing,
ay be a rupture of some minute bronchiole or air-vesicle, fol-
y interlobular emphysema. Undoubtedly, also, the mechanical
of such overdistension will be greatly enhanced by morbid condi-
f the lung-tissue which weaken its elasticity, such as are present
re bronchitis, especially when associated with constitutional dis-
Far more frequently, too, there is associated some cause of par-
truction to the escape of air, such as the spasmodic contraction
air-passages in hooping-cough, the presence of layers of false
ane in the larynx or trachea, or thickening of the bronchial
s membrane with plugs of viscid tenacious mucus in the tubes.

very possible, also, that in some cases interlobular emphysema
e caused by the implication of a minute bronchiole in the prog-
the softening of some spot of diseased tissue, so that the air
find entrance to the interstitial connective tissue without any
nical cause of overdistension and rupture of air-vesicles. Thus in
e reported above (p. 222) there was certainly a very close con-
between the position of the patches of tuberculous deposit and
llæ of subpleural emphysema, so much so that we cannot doubt
e escape of air was in some way favored by their presence. In
r case also, where interlobular and subpleural emphysema, fol-
by pneumothorax, occurred, and which is reported at length in
ticle on this latter affection (p. 255), it seemed to us that proba-
e softening of superficial circumscribed patches of pneumonia had
l into minute bronchioles, and thus allowed the escape of air.

PTOMS.—We have already seen that in young children emphy-
occurs usually in an acute form in connection with some acute
e of the lungs. Although, therefore, its presence may be sus-
l in such cases where violent paroxysms of cough have occurred,
ated with prolonged, severe dyspnœa, there are scarcely any phys-
gns by which its existence can be determined. The percussion-

resonance will continue clear, or even become somewhat exaggerated, and this fact of the absence of any dulness (due to pneumonia, collapse, or pleural effusion), in a case of hooping-cough or bronchitis, when severe cough has occurred with unusually extreme dyspnœa, is of diagnostic value. The respiratory murmur undergoes no immediate change in its character, and it is not possible, owing to the violent and rapid respiratory efforts of the child, to detect any diminution in the force of the murmur. Expiration in such cases is, however, often already prolonged and laborious.

The development of acute vesicular or interlobular emphysema, then, is suspected rather on account of the character of the disease from which the child is suffering than from any distinct substantive symptoms of these conditions. Exception is to be made, however, of the rare cases, in which suddenly, in the course of an acute pulmonary disease, a swelling is noticed at some part of the neck, or in the subclavicular space, which on palpation is found to crepitate. This may be regarded as, in all probability, connected with extensive interlobular emphysema. The other chief cause of such subcutaneous emphysema is perforation of the larynx or trachea, and the previous symptoms will enable us to exclude this rare condition without difficulty.

In other cases, however, vesicular emphysema in children assumes the chronic form, more usually found in adults, and will then be attended with the well-known symptoms of this affection. At times, it occurs evidently as a sequel to some acute pulmonary disease, in the course of which it has been developed in the manner above described, and after the original disease has passed away, it persists, either owing to original weakness of the lung-tissue, or to the extreme degree of the dilatation of the air-vesicles. At other times, it is met with as a purely chronic affection, which may begin in early childhood, and gradually increase until the disease is fully developed. In such patients there is probably some congenital weakness and tendency to degeneration of the pulmonary tissues. It is not unfrequently found that there are also evidences of rachitic disease of the ribs in such cases.

Children with chronic emphysema present various degrees of habitual dyspnœa, which is always readily increased by exertion. They are very subject to attacks of bronchitis, during which the breathing is much embarrassed and wheezing, the chest is full of sonorous and sibilant râles, and the cough occurs in severe paroxysms without much expectoration. During these attacks, not unfrequently the child suffers at night from violent paroxysms of spasmodic asthma. Indeed, it may happen that attacks of asthma will be induced in emphysematous children by the most trifling causes, such as changes of weather, indigestion, and the like. The attacks of bronchitis vary greatly in different cases in their relation to season and temperature; in some they occur almost exclusively during the damp, cold weather of fall and winter, while in others they are most frequent and severe during summer and spring, and the child finds more relief during cold weather.

The cough varies much in its intensity and character. During the tacks of bronchitis it is usually very severe, occurring in long spells, first with a little mucous expectoration, and later, as the attack passes er, with more abundant muco-purulent sputa. In the intervals of the tacks it may continue as an occasional dry and rather wheezing cough, it may be more troublesome on account of a certain degree of chronic ronchitis being always present, or finally it may altogether subside. fter the disease has lasted a considerable time, however, cough may ecome persistent, occurring most severely at certain periods of the day, and attended with a considerable quantity of muco-purulent expectoration. In such cases, when emphysema is conjoined with chronic bronchitis, the suspicion is apt to arise that the child is suffering from phthisis, and the positive determination of the diagnosis may indeed be attended with some difficulty. The reader is also referred to the remarks made in this connection on the subject of chronic bronchitis (see p. 211).

In young children under the age of 5 or 6 years, emphysema rarely reaches so great a degree, or persists for so long a time as to induce marked changes in the shape of the thorax, or to seriously affect their nutrition. In children somewhat older, however, when the disease is more severe and chronic, it may be attended with most of the symptoms familiar in the adult. The appearance of such children is apt to be frail and delicate, their muscular system develops slowly, and they become so readily fatigued and out of breath that they avoid play or much exercise. The shape of the thorax becomes gradually altered; the shoulders grow high and rounded, and the chest is prominent and distended in its upper part, while owing to imperfect expansion of the lower lobes, there may be perceptible retraction of the base of the thorax in front, or even a marked depression around the entire base of the chest. Of course, this is likely to occur to a more marked degree if the emphysema is associated with rickets.

The *physical signs* vary greatly with the extent and degree of the emphysema. In cases where it is limited to small areas of the lungs, scarcely any physical sign can be detected; but in partial and more severe forms, the following phenomena can be observed: The respiratory movements are restricted especially in the way of expansion; and during inspiration the movement is chiefly one of elevation effected by overaction of the upper respiratory muscles, and attended with an evident deepening of the depression around the base of the chest. The percussion-resonance is very full and clear, or even tympanitic, though owing to the marked resonance normal in children, it is difficult to determine the degree of its exaggeration. There may be associated some impairment of resonance over the retracted base of the thorax, and especially posteriorly, where there may be congestion of the lung with accumulation of secretion in the air-passages, due to the coexisting bronchitis. The respiratory murmur is weakened, though rarely to the degree noticed in adults; the expiratory murmur is decidedly prolonged and frequently wheezing. Both inspiration and expiration are apt to be accompanied with sonorous and sibilant râles. These, and especially the sonorous râles, are most markedly developed over the posterior parts of the lungs, near the larger bronchi. In some cases, moist râles may also be heard over the postero-inferior parts of both lungs, owing to the presence of an unusually large quantity of secretion in the smaller bronchial tubes. During one of the acute aggravations of the bronchitis, attended with nervous asthma, to which we have above alluded as being so frequent in such patients, a dry sibilant râle, distributed over the entire thorax, is often the only sound heard accompanying the labored respiration.

In marked cases, there will also be impairment of the resonance and fremitus of the voice, cough or cry. The apex-beat of the heart may be concealed by the distended lung, and the area of cardiac dulness is diminished. As before said, the alterations of the shape of the thorax and the marked physical signs now described are very rarely observed in children under the age of 5 or 6 years, and become more constant and more marked at later periods of childhood.

Case.—A., æt. 8 years, came under observation in the fall of 1873. The daughter of healthy parents, she was nursed until the age of 2 years. She suffered much from occasional diarrhœa for the first three years of life, but then improved in this respect. She cut her teeth without difficulty, and as rapidly as usual; began to walk at usual age. Has always perspired profusely at night, especially about neck and head, and when an infant was very troublesome from constantly kicking off the bedclothes at night. There was no muscular soreness.

At the age of 4 years she had a severe attack of spasmodic croup, and since then has been subject to frequent attacks of bronchitis, often associated with asthma. At first, there were only a few attacks each year, but for the past year they have followed each other with scarcely any intermission. She always suffers more during summer than in winter, and has found relief on several occasions by spending a few weeks during the summer at the seashore. The attacks usually begin as a simple catarrh, with sneezing for a couple of days, followed then by wheezing cough, shortness of breath, and nocturnal attacks of asthma. There is habitually dyspnœa on exertion, and the child has grown to care little for play, and to prefer staying quietly indoors. Lately there has been persistent and severe cough, with muco-purulent expectoration, feverishness, loss of appetite and strength. One year ago alteration in the shape of the chest was noticed. She was very much benefited last fall (when she was seen once by us) by the use of muriate of ammonia in full doses, with a mixture of quinia and arsenic; but after its cessation she has had a return of her troublesome symptoms. At present she is a rather tall and delicate-looking child, with high rounded shoulders. The upper part of the thorax, from above the clavicle down to the fourth rib, is distended. Below that level there is retraction of the anterior chest-walls, and on passing the finger parallel to the sternum there is a quite marked groove about one inch from each side of that bone, caused by incurvation of the ribs along that line. The expansion of the chest is limited. The apex-beat of the heart is at the sixth rib nearly 2″ below line of nipple, being apparently somewhat depressed. Percussion-resonance is exaggerated and almost tympanitic over supra- and infra-clavicular spaces, while over the retracted portions of the chest it is slightly impaired. The vesicular murmur is impaired, and over the superior part of the chest expiration is evidently prolonged. No râles are heard anteriorly, but posteriorly, at the base, and especially about the roots of the lungs, snoring râles are heard.

The case appears to be one of emphysema of the upper parts of the lungs, associated with deformity of the chest, partly due to rickets, partly to the emphysematous distension of the lungs, and attended with a varying degree of chronic bronchitis, with a tendency to spasmodic asthma.

She was ordered careful diet and clothing; salt baths daily; regulated gymnastic exercises with her arms; and the following medicines:

℞. Potass. Iodid.,	gr. ij.
Potass. Bromidi,	gr. v.
Syr. Ferri Iodidi,	gtt. v.
Syr. Tolutani,	gtt. xxv.
Aquæ,	fʒss.

Ft. sol. S. t. d.

The use of this was followed by improvement in appetite and strength, and by a marked diminution in the frequency and severity of the asthmathic attacks. As, however, the cough continued quite severe, with abundant loose mucous râles throughout the chest, the treatment was changed to the following:

℞. Syr. Phosphat. Comp.,	f℥ij.
Elix. Calisayæ,	āā f℥j.—M.
Aquæ,	

Dose. 2 teaspoonfuls in water before meals.

And to relieve the cough:

℞. Ammoniæ Muriatis,	grs. lxxij.
Syr. Senegæ,	f℥ss.
Tr. Hyoscyami,	fʒiss.
Ext. Pruni Virg. Fluid.,	f℥ss.
Syr. Zingiberis,	q. s. ad f℥iij.—M.

Dose. A teaspoonful in water three or four times in twenty-four hours, according to the severity of the cough.

Under the use of these remedies, her improvement has been rapid and continuous.

Diagnosis.—In regard to the detection of the acute form of emphysema at the time of its occurrence, we have already shown that there are no signs sufficiently distinctive, and that if any unusual severity or persistency of dyspnœa rouses the suspicion, we may only assume its presence in consequence of the great frequency with which it is developed in certain diseases.

This is even more true with regard to the interlobular than the vesicular form, except when the sudden appearance of subcutaneous emphysema proves its existence.

If, however, emphysema becomes firmly established, and persists, it becomes attended with the well-marked symptoms already described, and there are then scarcely any conditions with which it can be confounded. In almost all cases, there is associated bronchitis, either in the form of repeated acute attacks, or, more frequently, of a chronic form of varying degrees of intensity. It is therefore necessary to guard against overlooking the evidences of emphysema, and considering such cases as simple forms of bronchitis. In cases where emphysema of long standing is accompanied by severe and chronic bronchitis, it may be confounded with phthisis. Apart, however, from the fact that chronic phthisis is rare in childhood, a careful study of the history of the case, and of the physical signs, will enable us to avoid this error.

Prognosis.—Only in extreme cases of emphysema in children is the prognosis so unfavorable as in this condition in adults. In many cases where there can be no reasonable doubt that it exists to a considerable extent, the lung-tissue regains its contractility soon after the exciting cause of the emphysema has been removed, and all evidences of its existence gradually disappear. Even in more protracted cases, when the disease persists for some years, and leads to deformity of the thorax, there is ground for hope that, under the influence of the developing constitution and frame, and sustained judicious treatment, considerable relief will be obtained. This is equally true in regard to the tendency to attacks of nervous asthma, which is so frequently associated with emphysema, as it is true of its other symptoms. Children, who, at an early age, suffer severely with such attacks even from the slightest causes, are frequently seen to entirely outgrow the distressing tendency, and to bear any change of climate or vicissitude of weather without inconvenience.

The prognosis of mediastinal and subcutaneous emphysema dependent upon the interlobular form, is of course controlled entirely by the nature of the primary disease. It undoubtedly of itself aggravates the dyspnœa caused by the original pulmonary disease, but still very rarely reaches so extreme a degree as to endanger life. It must be borne in mind, however, that it is very frequently associated with pre-existing lesions of the lungs, which, either from their character or their extent, are almost necessarily fatal. Thus, of the 20 cases before referred to as on record, in only 4 has this accident been followed by recovery. It must, therefore, be regarded merely as a serious complication, but one which would not justify an altogether unfavorable prognosis in an otherwise curable condition.

TREATMENT.—The treatment of cases of acute pulmonary disease, in the course of which it is suspected that emphysema has occurred, cannot be much modified on account of this complication. As it is, however, closely dependent, in such cases, upon the frequent and violent cough, the most important indication is to allay this by suitable antispasmodics and sedatives. At the same time, as the increased dyspnœa which is caused by the development of the emphysema must seriously add to the exhaustion of the patient, the utmost care must be exerted to sustain the vital powers, and to discard every depressing element from the treatment.

The same remarks, which are used above with special reference to vesicular emphysema, apply with equal force to the interlobular form when it becomes complicated with mediastinal and subcutaneous emphysema. The only chance of recovery in such cases, is to be found in sedulously supporting the system until the primary disease (if of a curable nature) has passed away, and the effused air has been gradually absorbed. This absorption may be, to some extent, hastened by gentle frictions on the emphysematous parts with the hand. In cases where the extent of the external emphysema is such as to threaten life, minute punctures may be made in the distended skin, and the escape of the air favored by gentle pressure with the hands towards the point of puncture.

The most important field for medical treatment is, however, to be and in those cases where emphysema, whether acute or not in its incipncy, has passed into a chronic or persistent form. The indications for reatment which here present themselves, are mainly to relieve the hronic bronchitis, which is almost invariably associated with emphyema, if it has not been its chief cause; to eradicate any rachitic tenency which often coexists, and, so far as possible, to counteract its reults; to guard against and relieve the acute attacks of bronchitis often accompanied with nervous asthma, from which such children suffer; and finally to favor, so far as lies in our power, the restoration of the dilated lung-tissue to its normal condition.

There are several considerations of a general character, which will be found to have an important bearing upon these requirements.

Change of climate, when it can be judiciously made, is often attended with excellent results, particularly as regards the bronchitic irritation and the attacks of asthma. We have known children who suffered most severely from these conditions, which were aggravated by any trivial causes so long as they remained in their native place, but who on removal to other climates, received marked relief and gradually outgrew the disease. It is not at all necessary that this change should be to a distant spot; often the most convenient, dry, elevated inland locality will answer excellently.

The clothing of such children should be carefully studied and regulated. Without being so heavy as to oppress, it must be at all times warm enough to thoroughly protect; and at the same time there should be a suit of flannel or silk (consisting of an undershirt with long sleeves, and long drawers coming down to the ankles), of varying thickness to suit the season, worn throughout the year, to protect the surface of the body from the chilling effects of sudden vicissitudes of temperature.

As further means to secure activity of the circulation and function of the skin, the use of salt-baths (of a temperature to suit the season), and followed by brisk rubbing with a coarse towel, are to be recommended.

In no condition of the system is the use of gymnastic exercise more to be insisted upon. We should select those exercises with light dumb-bells or Indian clubs, which will tend to strengthen the muscles of respiration, expand the lower portions of the chest, which, as we have already pointed out, are apt to be retracted, with some incurvation of the ribs, from the coexistence of rickets at an earlier age. As children, in whom emphysema assumes the chronic form, are usually over the age of 6 or 7 years, such exercises can be readily carried out.

The selection of the diet should be made with care. It will often be found that all the symptoms are aggravated by any digestive disturbance, and we have seen, as is indeed frequently the case in emphysema of adults, violent paroxysms of nervous asthma induced by indigestion. As the digestion in such children is apt to be weak, this point requires the greater care.

As regards medication, the most important remedies are such as will affect the constitution favorably.

We should recommend the use of cod-liver oil in properly gradua doses, and, especially where there are evidences of rachitic dise the compound syrup of the phosphates or the lacto-phosphate of l may be advantageously associated in the form of emulsion. If iro not thus administered in the form of the phosphate, the oil may given alone, and iron should be taken separately in some other con nation, as in the following:

℞.—Potassii Bromidi,	ʒij.
Potassii Iodidi,	gr. xlviij.
Syr. Ferri Iodidi,	fʒij.
Syr. Tolutani,	fʒvj.
Aquæ,	f℥ij.

Ft. sol. S.—A teaspoonful thrice daily in a little water.

The dose here directed is for a child of about 8 years of age.

We have also found the prolonged use of arsenic for its constitutio effects of much value in some cases.

Cough should be relieved, so far as possible, without the use of o ates and nauseating expectorants. Among the drugs which we ha found most useful in controlling it, as well as in relieving the chro bronchitis upon which it usually depends, are the iodide of potassiu which may be advantageously combined with the potassium bromi as in the above prescription, the bromide of ammonium, and the mu ate of ammonia. If the cough be very troublesome, especially at nig tincture of hyoscyamus and minute doses of morphia may be occasi ally associated. It may, however, become necessary to substitute these, or to combine with them, other alterative and stimulant exp torants, such as seneka or copaiba.

The use of quinia, and, at times, of strychnia with it, is indica throughout a large part of the treatment for the useful influence these drugs upon the digestion and general nutrition, and especia upon the tonicity of the muscular system.

The acute attacks of nervous asthma which are apt to occur fr time to time must be relieved at the moment by the prompt use of laxing emetics, hot mustard-water foot-baths, the inhalation of ether of the smoke of stramonium cigarettes. The frequency of these distr ing attacks will, however, be greatly influenced by the persistent ployment of the general treatment above sketched.

Finally, it must not be forgotten that despite the obstinacy and verity of the symptoms of emphysema in some cases, and the posit alterations of the shape of the thorax, there is always reason to h that, if we can succeed in removing the element of chronic bronchi and in favoring the expansion of the lower lobes of the lungs, so a these ways to relieve the strain upon the upper portions of the orga the distended vesicles will gradually regain their elasticity, and as thorax enlarges with advancing years, all symptoms of the disease pass away.

ARTICLE V.

PLEURISY.

Definition; Frequency; Forms.—Pleurisy consists in inflammation the pleural serous membrane.

Idiopathic pleurisy is a rare disease under five years of age, and pecially in the first and second years of life. After the age of five ears it becomes more frequent. We have met with 28 cases of pleuisy, of which we have kept notes. Of the 28, 26 were idiopathic, and secondary; one of the latter occurring during hooping-cough, and the ther being accompanied by pneumonia, though the pleurisy was the redominant disease. Secondary pleurisy, on the contrary, or that which occurs in the course of other diseases, is common at all ages. M. Bouchut met with it in 23 out of 68 autopsies of new-born and suckling children. Of the 23, 9 accompanied acute pneumonia, 6 tubercular pneumonia, 5 entero-colitis, and 3 different other diseases. This form of the affection is rarely detected during life, being masked by the concomitant malady.

We shall describe two forms of the disease, the *acute* and *chronic.*

Predisposing Causes.—As to the influence of *age*, it has already been stated that idiopathic pleurisy is rare between birth and five years of age. It is certainly rare, during those years, in comparison with pneumonia, and especially with bronchitis, for we find that while we have met with but 15 cases of pleurisy of all kinds under five years of age, we have seen 28 of pneumonia under that age, and 105 of bronchitis under six years of age. Of 28 cases of pleurisy that we have seen, 26 were idiopathic, and of these one occurred at the age of three months; three between 1 and 2 years of age; one between 2 and 3; four between 3 and 4; eight between 4 and 5; three between 5 and 6; two between 6 and 7; three between 7 and 8; and one between 13 and 14. Of the two secondary cases, one occurred at six weeks of age, and one between 4 and 5 years. Secondary pleurisy is said, by the best authorities, to be most frequent between one and five years of age, being, in this respect, just the contrary of the idiopathic form of the disease.

Pleurisy is said to occur more frequently in boys than girls. Of 26 cases, in which we noted the sex, 19 occurred in boys and 7 in girls. The idiopathic form is most apt to occur in vigorous and hearty subjects, while the chronic and cachectic forms attack those who are feeble and delicate. It is often, as already stated, a secondary affection, occurring particularly during pneumonia, and, after that disease, during rheumatism, scarlet fever, and Bright's disease. *Season* is another predisposing cause. It is most common during winter and spring, especially the latter.

The *exciting causes* are very obscure in most cases. The only ones which seem to have been ascertained with any certainty, are exposure to cold and sudden changes of weather. It has been said to follow external violence. In one of the cases that came under our own observation, the child had struck the affected side severely against a pointed stick on the day of the attack.

ANATOMICAL LESIONS.—The serous membrane may retain its natural characters, which happens in the majority of cases, or it may present the different appearances indicative of inflammation. These are more or less minute and abundant injection and punctuation, and spots or patches of an ecchymotic appearance, observable particularly at the points where the formation of false membrane has taken place. Another change produced in the pleura by inflammation is the loss of its natural polish, which is replaced by a more or less granular and rough appearance. In chronic cases it becomes whitish or opaline in color, and thickened. It is very rarely softened.

In addition to the lesions of the pleura itself there are various diseased products of secretion which require notice. These may be either solid or liquid. The solid products are the false membranes which exist so generally in all serous inflammations. They are found both upon the costal and pulmonic pleura. In their recent state they are of variable size and thickness, being in some cases very soft and deposited in small points; in others, more extensive, but thin, like paper; and in others again thicker (one or two lines in thickness), firmer, and decomposable into several layers. The outer layers are yellow, elastic, and soft, while the inner ones are red, more resisting, and marked with vascular arborization. When examined some time after their formation, the false membranes are found to have been converted into cellular adhesions, which may be either very loose, or they may fasten the lung tightly to the costal pleura. The adhesions are generally, however, thin, transparent, and in the form of loose bridles. After a length of time, the false membranes come to present the appearances of true serous tissue, and like that, are susceptible of inflammation.

The fluid found in the pleural cavity usually consists of transparent or turbid serum, holding albuminous flocculi in suspension. Sometimes, but more rarely, it consists of purulent serum, and still more rarely of pure pus. The liquid generally occupies the lowest portion of the thoracic cavity, but is sometimes circumscribed at various heights, or between the lobes of the lung by abnormal adhesions, or by some part of the lung which has been rendered incompressible by inflammation.

The lung presents various alterations from its healthy condition. It is pressed backwards towards its root to a greater or less extent. The tissue of the organ is generally found in one of two conditions: either hard, not crepitating, impenetrable to the finger, and presenting a smooth surface when cut into, a state of things which has been expressed by the term *carnification*, and which is a mechanical effect of pressure; or else the lower lobe, which is in contact with the fluid, is large, heavy, fleshy, rather hard, not so easily penetrable by the finger as in simple hepatization, yielding under pressure only a small quantity of blood, and but slightly retracted towards the spinal column. The latter condition depends in all probability on an effusion which has occurred after, or coincidently with hepatization.

In some cases, in which the effusion is but small, or where it has en absorbed, the lung is found to be elastic and crepitating. Whater the amount of effusion may be, it is said that the lung can always pand to its normal size if the fluid be absorbed, unless it has been too mly bound down by false adhesions.

Pleurisy, whether complicated with pulmonic disease or not, is much e most frequently confined to one side. In idiopathic cases, it is ore common on the right than left side; when it accompanies pneuonia, it is, on the contrary, more common on the left than right.

SYMPTOMS.—In describing the symptoms, we shall treat first of the hysical, and then of the rational signs, and of the course of the disease.

The *physical signs* are exceedingly important, as they often constiute, especially in young children, the only means of recognizing the isease. The *pleural friction-sound* is less important than some other hysical signs, as it is scarcely ever heard in children under five years f age, and only during the absorption of the fluid, as a general rule, n those above that age. *Bronchial respiration* may commonly be deected from an early period in the attack. At first it is heard during nspiration, but afterwards it exists both during inspiration and expiation, or in the former alone. In a majority of the cases it is heard ver the posterior portion of the thorax, and upon one side only. At first it is audible over nearly the whole height of the affected side, while later in the disease it can be perceived only at the inferior angle of the scapula or in the interscapular space. Its duration is variable; it may disappear in a few days, or last for a much longer time. In favorable cases it is usually replaced by feeble vesicular respiration, more rarely by friction-sound, and sometimes by pure respiration. This sign is almost always present at all ages in acute cases, but is often absent in those which are slow and tedious. In suckling children it is not constant, but intermits occasionally, so that it may be heard at one and not at the next examination. *Ægophony* can rarely be detected in children less than two years old. Under that age, there is heard instead of it resonance of the cry, especially in the region beneath and on a line with the spine of the scapula. It is intermitting, like the bronchial respiration. In children over two years old, ægophony can often be distinguished by careful examination, but never, of course, unless the quantity of effusion is considerable. It is heard at an early period of the attack, and chiefly in acute cases, and must be sought for in the lower portion of the interscapular space, and the inferior dorsal region. It coexists almost invariably with bronchial respiration, lasts but a short time, disappearing after one, two, three, or four days, and it is intermitting. In older children, it is sometimes replaced by diffused resonance of the voice, as it is by resonance of the cry in infants. In a case that occurred to one of ourselves, in a girl between six and seven years old, and in which the disease became chronic, the voice was not purely ægophonic, but reedy and quavering, from the fifth to the tenth day. After that date the effusion became so great that all sound was suppressed.

Feebleness or absence of the respiratory murmur seldom exists at the beginning of acute cases, but in the subacute or chronic form is generally present from the invasion. In the latter class of cases feeble respiration is noticed first over the inferior portion of the dorsal region, but as the effusion increases, it is heard also in the upper and anterior regions, and becomes more and more marked, until at length no sound whatever is audible; the respiratory murmur is suppressed. In acute cases, on the contrary, the absence of the respiratory sound is observed at variable periods of the attack; when noticed soon after the invasion, it is generally coincident with bronchial respiration, which, heard at first over the whole or the inferior three-fourths of the dorsal region, becomes afterwards perceptible only in the interscapular space, or at the inferior angle of the scapula, while the respiration is feeble or absent over the lower portions of the lung. In acute cases the feeble respiration remains limited to the dorsal region, and disappears after a few days,—in from five to eight, according to our experience; while in chronic cases it extends over a larger surface, and continues for several weeks, or even months.

Percussion.—This means of diagnosis is very important in all cases of the disease accompanied by effusion of liquid, unless the quantity be exceedingly small. When, on the contrary, the inflammation results merely in the production of thin false membranes, percussion furnishes no useful information.

Percussion is of no assistance, however, at the moment of invasion, as it is not until the period at which effusion takes place that the resonance of the thorax begins to be altered. In acute cases, the resonance is generally duller than natural, though seldom entirely dull, on the second, third, or fourth day. As the effusion augments, the dulness increases over the region occupied by the fluid, until at length all resonance ceases, and the sound is perfectly flat. The degree of dulness can be properly appreciated only by comparing the two sides together. The degree, extent, and duration of this sign will depend, of course, upon that of the effusion. In children, as in adults, the sounds afforded by percussion vary with the position of the patient, which influence, of course, the situation of the fluid in the pleural cavity.

In regard to the physical signs of pleuro-pneumonia, it may be stated that when a pleuritic effusion takes place in a child laboring under pneumonia, it happens, as a general rule, that the bronchial respiration occasioned by the inflammation of the lung increases in intensity, though in some few cases it is diminished or suppressed. MM. Rilliet and Barthez lay down the following principle: "That *when a pleuritic effusion occurs in a child affected with hepatization of the inferior portion of the lung, all the abnormal sounds which were perceptible over the diseased point are considerably exaggerated, and the sonority disappears.*"

Inspection of the thorax affords no assistance at the invasion of the disease, nor generally in acute cases which last but a short time, and in which the amount of effusion is small. When, however, the effusion is large, it may be observed, upon close examination, that the movements e affected side during respiration are more limited than those of pposite one, and that the intercostal spaces are more projecting natural, in consequence of distension by the fluid within. At the time *mensuration* will show that the side on which the effusion s is larger than the other. The difference may amount to one- or two-thirds of an inch. In acute cases in which the quantity quid is small, mensuration will of course show no difference.

lpation is an important means of diagnosis, especially in making distinction between pneumonia and pleurisy. In the former dis-, the vibration of the thoracic walls during either crying or speak- is augmented; whilst in the latter it is diminished, or when the ion is considerable, ceases altogether. This sign is important, both fants and older children.

ATIONAL SYMPTOMS; COURSE; DURATION.—Acute pleurisy is rarely with, as already stated, in children under six years of age, except secondary affection. In idiopathic cases it begins with severe pain he side, cough, some difficulty of respiration, increased frequency of pulse, loss of appetite, thirst, bilious vomiting, sometimes headache, in rare instances delirium. The *pain* in the side or *stitch* is almost ays present in acute cases occurring in healthy children, while in se which are slight, or which occur in weak and debilitated subjects, ery young children, it very often cannot be detected. Sometimes, ever, its existence may be ascertained in very young children by derness of the side shown during the act of percussion. When pres- in young children, it can always be detected by watching the face he child and observing its gestures during the act of coughing, and ing full inspirations, as in those made in crying, after sudden move- nt, or in the act of gaping. In an infant of thirteen months old, o was attacked with pleurisy of the right side, causing effusion of ck yellow pus into the right pleural sac, and which ended fatally in onth, only the blindest observer could fail to see that every act of ghing was acutely painful, for the child uttered each time a short, lden cry, which was hushed as soon as given, while at the same mo- nt there passed across the face an expression, amounting almost to a mace, of suffering, which was unmistakable. The pain is aggravated coughing, by full inspirations, by change of position, and by percus- n. The seat of pain is almost always in front, but it may extend egularly over the whole of one side to the arm, or it may be con- ed to the false ribs, or less frequently to the neighborhood of the ple; it generally lasts from three to six days, though it sometimes ntinues longer. This symptom was complained of in most of the ses that we have seen. In some it was very acute and severe for e or two days, while in others it was slight, not well defined, and ry transitory. In one, the child said there was no pain, but a sensa- n of weakness in the side when she coughed. In another, the pain as severe for a few hours, but was relieved by a sinapism, and was t felt again, though the attack resulted in a very large effusion into e side. In a third it lasted a week, and in a fourth only two days, though in both the effusion was extensive, and required several wee for its absorption. In a fifth case it continued for five days. In th last, the effusion was very slight. It was aggravated in all these cases by coughing, by the act of respiration, especially when this was deep, and by motion.

Cough exists in nearly all idiopathic cases, and generally from the onset, though sometimes not before the second or third day. Usually frequent and dry, it commonly retains these characters in acute cases, for four or six days, and then diminishes rapidly. In more tedious cases it continues for a longer time, but moderates in violence after some days. In secondary cases it has no special characters. It was present in all but one of the cases seen by ourselves. Its character varied very much. In some it was frequent, teasing, and very painful. In others it was rare, scarcely troublesome, and only slightly painful. In all it was very dry, this constituting one of its most marked features, and giving it a very different character from the cough of bronchitis, and also, though somewhat less distinctively, from that of pneumonia. It continued almost entirely dry throughout the disease, except in a case which became complicated after a time with slight bronchial inflammation, and, in that, it became loose. There is generally no *expectoration;* if any, it consists of a small amount of whitish, frothy, seromucous fluid.

The *respiration* is usually accelerated in acute cases, but remains natural in other respects; the dyspnœa, however, is slight, as a general rule, compared with that of pneumonia. The difficulty of breathing is commonly in proportion to the earliness of the age, and to the extent and rapidity with which the effusion takes place. In the acute cases that came under our own observation, the breathing was usually about 36, 38, 40, and 48, but in one case it rose to 68 for a single day. It was not labored, and appeared to be difficult only from the fact of its being more or less painful. In a case of double pleurisy that came under our observation, it was most laborious, and dreadfully painful, as was also the cough. In the cases attended with but slight pain, there was no dyspnœa. It usually subsided after two or three days, when large effusion took place, converting the case into the chronic form.

The *fever* is not usually very great, and seldom lasts more than a few days, or a week. In some few cases, however, that we have seen, the febrile reaction has been very high. In one, in a child between three and four years old, the pulse rose to 172 on the first day, though the respiration was but 36; the skin was very hot and dry, and there was very great drowsiness and inattention. In other cases the pulse was 140, 128, and 124. The acceleration of the pulse usually lasts three or four days, after which it falls, so that by the end of a week it is seldom over 70, 80, or 90. The *heat* of skin is not very great in most instances, and generally subsides rapidly and disappears after a few days. Thus during the first few days of the attack, the temperature may rise to 103° or 104°; but it soon falls, and, during the remainder of the case, usually fluctuates between 100.5° and 102°. When the case is complica-

pneumonia, the elevation of temperature is even more marked
ists for a longer time. In acute secondary attacks, the febrile
ns are more marked, as a general rule, than as has just been
d, because of the existence of the concurrent disease.

untenance presents no particular characters, except that an ex-
of pain passes across it occasionally when the child coughs, or
deep breath. It is seldom deeply flushed as in pneumonia.
nasi are dilated only during the continuance of the difficulty
tion.

cubitus is generally dorsal or indifferent. In two cases ob-
y us, in which the effusion was large, the number of inspira-
always from three to five greater when the child laid on the
an when on the affected side.

he is often present during the first few days, in children over
of age, and is sometimes very severe.

ions are said to occur sometimes at the onset in very young
The *strength* is not usually much diminished, except during
period. The *appetite* is diminished and the *thirst* acute, but
f these symptoms is so marked as in pneumonia. The *tongue*
moist, and sometimes covered with a coat of whitish fur; the
is natural.

vomiting is said to occur in more than half the cases. The
generally regular, or there is some constipation.

ation practised soon after the invasion generally reveals rude
hial respiration without any râles. The percussion is dull.
h, pain, fever, and difficulty of breathing continue for several
r which all but the cough generally disappear, while that com-
rsists in a mild form. In acute cases, the appetite now begins
, the thirst moderates, and auscultation reveals only feebleness
spiratory murmur, with slight dulness on percussion. The
ymptoms cease soon after this, and the patient is entirely
ent in from one to three weeks, though feeble respiration and
d resonance sometimes persist for a longer period.

—The urine in pleurisy has the so-called febrile characters, but
ot in any degree approaching to the urine in pneumonia, the
ng less diminished, and the urea less increased. In cases where
rapid effusion into the pleura, the chlorides are lessened or
nting; and reappear as the effusion is absorbed. Albumen is
ever present.

c PLEURISY may follow the acute form, or occur as an idio-
sease. In the former case, the acute symptoms diminish after
e length of time, but the fever does not cease entirely and often
wards evening. In the latter case there is usually a very
degree of fever at first, which soon subsides and then disap-
there is none at all; the pain is generally, though not always,
ncertain, and attracts but little notice. In one case that we
, the cough was frequent, rather dry, and very painful for the
days, after which it became looser and ceased entirely, though

the inferior two-thirds of the right side were filled with effusion for a period of two weeks afterwards. In a second, in which the whole of the left side was occupied by the effusion, there was no cough whatever. In a third, there was a very slight, infrequent cough during the first day, but after that, though the effusion occupied the right side up to the spine of the scapula, there was none through the day, and merely a little hacking at night. In a fourth, in a girl between four and five years old, there was considerable fever during the first week, but literally no local symptoms whatever, so that the case was mistaken for one of bilious fever by another physician. When it came under our notice, some obscurity in the symptoms led us to examine the chest, where we found an effusion occupying the lower third of the right side. The fever was now diminishing, and soon disappeared, but the effusion increased, without pain, and with only an occasional cough, until it filled up three-fourths of the side. It then stopped, and after several days, began to recede. At the end of about six weeks, the child was quite well again, and continues so to this time, about three years. In a fifth case, in a boy, between five and six years old, the attack was extremely obscure. There was very slight fever, almost no cough, indeed none except upon some exertion being made, and then scarcely noticeable, and no severe pain. In fact, the child complained of no pain whatever, but upon being asked, referred to an uneasy sensation in the inferior lateral region of one side. The tongue was coated, and the symptoms were rather those of some bilious derangement, than of anything more serious. It was not until after four or five days of attendance, that a careful examination of the chest showed the existence of a slight effusion in the right side. This gradually increased until it reached nearly up to the clavicle, and then slowly disappeared again. The respiration is somewhat accelerated in all cases, and when the effusion is very large, and especially when it is purulent and attended with violent hectic fever, it is sometimes excessively labored and difficult. In the cases that we have seen, however, even when the effusion has been very large, the breathing has not been difficult. In one case it was between 40 and 50 during the first two days, after which it fell, as the effusion took place, to 30. In a second it was 45 at first; at the end of a week it was 38; at the end of the third week, as the effusion was being absorbed, it had fallen to 28, soon after which the recovery was completed. In a third it was so slightly disturbed that we did not at first suspect any disease of the chest. On the fourteenth day, the effusion reaching then nearly to the spine of the scapula, the breathing varied between 40 and 28 during sleep, but during the waking state there was no visible oppression.

The effusion takes place gradually, and is generally large. The percussion is now entirely dull over a greater or less extent of the side, and the respiratory sound is suppressed. The side is evidently enlarged, the increase of size being visible to the eye and ascertainable by measurement. If the effusion be purulent, constituting empyema, and the case is to end unfavorably, the child emaciates, grows pale, has night-sweats nd hectic fever, and dies at last in a state of profound exhaustion. In ome cases where the effusion has been at first serous, and later beomes purulent, the development of empyema is clearly indicated by a eturn of elevated temperature, which now persists with very marked morning remissions and evening exacerbations. In favorable cases, on he contrary, and nearly all those in which the effusion is sero-albuminus belong to this class, the effusion is gradually absorbed, and the paient recovers with a contraction of the side. In some instances the fluid as been evacuated by an opening through the parietes of the thorax, aused by ulceration or made by a surgical operation; and in others gain by an opening into the lung, through which the fluid has been xpectorated. In one case that came under our own observation, in which the effusion was purulent, a natural cure took place by the evacuation of the fluid through an opening in the walls of the chest. This case occurred in a very hearty boy, of between four and five years of age. He was taken sick in the country, with what was supposed to be an attack of typhoid fever. After many weeks of violent illness, an abscess showed itself in the neighborhood of the left nipple. This, at the end of two months, discharged, and the patient began to improve. At the end of three months, he was brought to town, and we saw him. We found a fistulous orifice, discharging occasionally considerable quantities of pus, just below and inside of the left nipple. The left side was very much contracted, and the lung was retracted into the upper part of the chest. He was put upon cod-liver oil, wine, and nutritious food, and gradually improved. He was soon removed to the country, and we did not see him again, but have since heard that he had entirely regained his health. The recovery by absorption has been known to take place two and five months after the invasion. In one case that we saw, the duration from the time when the effusion took place to its complete absorption was five weeks; in a second it was between six and seven weeks; in a third, six weeks; in a fourth, seven; and in a fifth, two months.

Diagnosis.—Pleurisy may be confounded with pneumonia or hydrothorax. From the latter affection it is to be distinguished by the absence of pain in that disease, by the existence of the effusion on both sides of the thorax in most cases, and by the fact that hydrothorax generally follows as a consequence of some previous disease, particularly the eruptive fevers or nephritis.

The distinction between acute pleurisy and lobar pneumonia is more difficult than that between pleurisy and hydrothorax, and in some instances is subject to considerable doubt. It may generally be arrived at, however, by attention to the differences laid down in the following table, which is taken from the Bibliothèque du Médecin Practicien:

ACUTE IDIOPATHIC PLEURISY.	ACUTE IDIOPATHIC PNEUMONIA.
Frequent after six years of age; rare under that age.	Frequent after six years of age; more rare under that age, but much less so than pleurisy.

ACUTE IDIOPATHIC PLEURISY.	ACUTE IDIOPATHIC PNEUMONI
Begins with dry cough, sharp thoracic pain, bronchial and metallic respiration during inspiration, either on the first day or later, and more rarely with obscurity of the respiratory sound.	Begins with cough, slight th pain, and crepitant or subcrepitant chus; at a later period there is bro respiration during the expiratio bronchophony.
Modification of the physical signs by change of position.	No modification under like ci stances.
Fever and acceleration of the respiration usually moderate. Rapid diminution of these symptoms from the fourth to the seventh day.	Fever violent; considerable acc tion of the respiration. Diminuti these symptoms less marked, less and not before the sixth or ninth da
Expectoration absent or very slight.	Expectoration mucous; sometime guineous; very rarely rust-colored.
No rhonchi.	Rhonchi preceding, following, often accompanying the bronchial ration.
Absence of vibration of the thoracic parietes during speaking or crying.	Augmentation of vocal resonance sensible in older children, and in degree in all.
Course of the disease irregular; rapid disappearance in some cases, prolonged duration in others. The bronchial respiration is substituted or masked by feeble respiration.	Course of the disease regular; st increasing in most cases, and then d ishing from the sixth or ninth day. chial respiration more disseminated.

In some cases, especially in young children, where the onset of risy is very sudden and acute, the general febrile disturbance ma tirely mask the local symptoms, and lead to the belief that some of the exanthemata is about to develop itself.

Thus we have met with cases where, in the midst of full health, child has been seized with violent fever; extreme restlessness alte ing with stupor; repeated vomiting; great frequency of pulse; a eration of respiration; but with little or no cough and no comp of pain in the side. In one instance of this kind, the heat of rapidity of pulse, and frequency of the vomiting were so marked for twenty-four hours we suspected the approach of scarlet fever, not until the second day were we able to satisfy ourselves of the na of the attack by observing that the act of respiration was evid painful, and by detecting the physical signs of plastic pleurisy the right apex posteriorly.

In 2 cases, one at the age of 3 months, the other at 1½ years, we observed most excessive and almost tetaniform reflex irritabilit that the slightest movement of the child's body, or the attempt t amine the chest, would provoke violent startings and spasmodic tractions of the entire body. In both of these cases a fatal r followed, and post-mortem examination revealed the presence of ized empyema.

The chronic form of pleurisy with extensive effusion may be e distinguished by the history of the case, by inspection, palpation, mensuration of the chest, by the nearly total absence of sonority, of the respiratory murmur except at the inner edge of the sca and by attention to the character of the general symptoms.

Prognosis.—Acute pleurisy is rarely a fatal disease in healthy subects. When it occurs as a complication of some other malady, on the contrary, it is much more apt to terminate unfavorably. The degree of fatality in secondary cases will depend, of course, in great measure, on that of the primary disease. Pleuro-pneumonia is a more dangerous disorder than either alone. Of 5 cases of primary pleuro-pneumonia, observed by Rilliet and Barthez, 2 died; while of 10 secondary cases, 8 died.

Of the 28 cases of pleurisy that we have seen, 5 died. The 5 fatal cases were all primary; 4 of them occurred in infants, 2 at 6 weeks, and the others at 13 and 18 months respectively, and the fifth was a case of double pleurisy in a boy between 4 and 5 years old. Of the 23 children that recovered, one was between 1 and 2 years of age; one between 2 and 3; three between 3 and 4; while eight were between 4 and 5 years of age, and the remainder over that age. In our experience, therefore, the mortality was, as might have been expected, much greater in those cases occurring at a very early age.

Chronic pleurisy is generally a serious, and not unfrequently a fatal disease, though since the more frequent and more skilful use of paracentesis many cases are cured which would formerly have proved fatal.

Treatment.—The *hygienic treatment* in this, as indeed in all the diseases of children, is of the utmost importance, and ought to be regulated by the practitioner himself. In all forms of the disease, the child should be carefully protected from cold, and in the acute form, kept at rest, and, if possible, in bed. The diet must be very strict, and should consist for a few days of the preparations of milk. After the fever has disappeared, bread and milk, vegetable soup with a few oysters boiled in it to make it agreeable, and gradually rice, potatoes, and at last small quantities of meat, may be allowed. In the chronic form the diet ought to be nutritious, but regulated with equal care as to quantity and material. In that form the patient should be taken into the air if the weather be mild and dry, and in winter the chamber ought to be well aired from time to time.

Bloodletting.—In acute cases occurring in vigorous children over five years of age, marked by intense fever and pain in the side, and which are seen soon after the onset, local depletion may be employed. The amount of blood to be taken should not exceed two or three ounces; and this should be withdrawn by small cups applied over the seat of inflammation. In younger children, as well as in all whose constitutions are not robust, it is better to limit ourselves to the use of a few dry cups.

Depletion in any form ought to be avoided in most of the secondary cases, unless the symptoms are very acute and the child strong and vigorous; also in all chronic cases, after the febrile symptoms have been dissipated, and in feeble, delicate children.

Antimonials—Febrifuges—Opiates.—A moderate use of the antimonials is of great service in the acute stage of the disease. Small doses of antimonial wine and sweet spirit of nitre, or fractional doses of sulphurated antimony, as recommended in the article on pneumonia, will generally cause the fever, dyspnœa, and cough to subside rapidly. Large doses are unnecessary in any case, and are liable to be injurious in all.

In cases in which antimonials ought not to be used, as where they are opposed by some idiosyncrasy, in children of low vital force, and in the secondary form of the disease, we have found a citrate of potash mixture, containing ipecacuanha and opium, and digitalis, when the heart is much excited, very useful. The quantity of opium must be proportioned to the pain. When this is severe, the doses must be full. The good effects of this remedy in serous inflammations are now generally acknowledged. At two years of age, one drop of laudanum in the above mixture, every two hours; or half a grain of Dover's powder, with the twelfth of a grain of sulphurated antimony, every two hours, until a decidedly tranquillizing effect is obtained, may be used. When positive drowsiness has been brought about, the doses ought to be given at longer intervals—every three or four hours.

Mercury.—In former years mercury was constantly employed in conjunction with bloodletting. In our last edition we opposed its use as unnecessary in acute cases, but stated that there was high authority for employing it in cases of the acute form tending towards the chronic, and in confirmed chronic cases; adding, however, that we had not found it necessary even in these. We find, now, that Dr. West, of London, still speaks highly of it. He says (*loc. cit.*, p. 303): "After depletion, our chief reliance is to be placed on calomel, which should be freely given in combination with opium or Dover's powder; and an attack of pleurisy thus treated will often be cut off in thirty-six or forty-eight hours." Dr. J. Lewis Smith, of New York (*loc. cit.*, p. 279), does not even mention mercury in his remarks on treatment. Dr. Thomas Hillier (*Diseases of Children*, Amer. ed., 1869, p. 87) says: "Formerly I gave mercury to all cases of primary pleurisy, but this practice I have discontinued, except in the form of an aperient. Instead of it, salines, such as acetate of ammonia, nitrate of potash or soda, the citrate of potash, and nitrous ether, are given."

The experience we have had, since we last wrote, has not at all increased our faith in this remedy. We believe that as time goes on, and knowledge grows, there is good reason to think that the good effects formerly ascribed to calomel in such a variety of diseases, were largely due to the medicines given with it, and particularly the opium (without which it was not often used), the ipecacuanha, the salines, and even the antimonials.

The remedies employed by ourselves, after the disappearance of the acute symptoms, when the effusion has taken place, and especially if there seems any tendency for the case to pass into the chronic form, are either iodide of potassium in syrup of sarsaparilla, according to the following formula:

℞.—Potass. Iodidi, ... gr. xvj ad xxxij.
Syrup. Sarsap. Comp.,
Aquæ, āā, ... f℥j.—M.
Dose, a teaspoonful three times a day;

the syrup of the iodide of iron, of which from thirty to sixty drops ould be substituted for the iodide of potassium in such a mixture as e above. The iodide of potassium is preferable in the early stage. fter a time, and especially in anæmical and delicate patients, the dide of iron should be substituted. Under this treatment, combined ith the application of a Burgundy pitch plaster to the side, or some ther form of counter-irritant, the effusion has usually disappeared in om two to eight weeks, though diuretics may have failed to make ny impression on the cases.

Diuretics are highly recommended in the treatment of cases in which ffusion has taken place. Those chiefly employed are squills, digitalis, nd nitre. The squill is given alone, or in combination with digitalis, nd by some with calomel, or with both. The dose of the powder of quill or digitalis, is about a quarter of a grain every two or three ours. The squill may be used also in the form of syrup or oxymel, nd the digitalis in tincture. These two substances may be employed n the following formula:

℞.—Acet. Scillæ,	fʒij.
Tinct. Digitalis,	gt xxx.
Aquæ Fluvial,	f℥iv.—M.

Of this a teaspoonful is to be given three or four times a day to children two years old. This formula was made use of for several days in two of the cases referred to, without any perceptible diminution in the amount of the effusion, whereupon it was suspended, and the iodide of potassium, and afterwards the iodide of iron, as above recommended, substituted, and with much better effect.

Purgatives ought to be used during the acute stage of pleurisy to an extent sufficient to keep the bowels soluble, and to act as mild evacuants. In chronic cases, on the contrary, they are particularly recommended as evacuants, in order to deplete the bloodvessels, and thus hasten the absorption of the effusion. So far as our experience goes, this treatment is unnecessary, as diuretics and alterative tonics are generally sufficient, without a resort to violent remedies, which must irritate the intestinal mucous membrane, always extremely susceptible in children, to a dangerous degree.

Tonics are often necessary in chronic, and sometimes, after the febrile symptoms have subsided, in acute cases occurring in feeble and delicate children. The most suitable are quinine, in the dose of a grain morning and evening, small quantities of port wine, and the preparations of iron.

External Remedies.—Blisters are very generally employed, in the acute form, to relieve pain and dyspnœa, and, in the chronic, to hasten the absorption of the effused liquid. We did not apply them in the cases under our charge, having succeeded very well without; but would not hesitate to make use of a small one, applied for a not longer period than two hours, if the pain and oppression persisted. In chronic pleurisy the application of a large Burgundy pitch plaster, made rather weaker than what is used for adults, and large enough to cover nearly the whole side, would be preferable to blisters. We are also in the habit of painting the chest-wall, over the seat of the effusion, with dilute tincture of iodine, every day, or as frequently as the irritability of the skin will permit. The following mixture is of about the proper strength for a young child:

℞.—Tr. Iodinii,	fʒiij.
Chloroform,	fʒj.
Alcoholis,	fʒiv.—M.

Paracentesis.—Of late years, the operation of paracentesis, in cases of pleurisy, both acute and chronic, has been performed so frequently, and with such encouraging results, that it may now be considered to occupy an assured position among the remedies for certain conditions of this disease. It appears desirable, therefore, to discuss somewhat in detail the circumstances in which it is applicable, the indications which call for it, and to a certain extent the mode of its performance. In doing this, we shall avail ourselves freely of the admirable and exhaustive discussion of this operation by the lamented Trousseau (*Clinique Médicale*, tom. i, pp. 619–698), to whose practice and teaching it was in great part due that paracentesis thoracis was first generally recognized as a justifiable operation for the relief of excessive pleuritic effusions.

In acute pleurisy he recommended the operation more frequently than most authorities consider necessary. Whenever, indeed, the effusion becomes so excessive as to almost entirely fill the pleural sac on the affected side, displacing the adjacent viscera seriously, whether the patient presents intense dyspnœa or not, he advises its performance. The reasons urged by him for this practice were, that although ordinary cases of acute pleurisy almost invariably recover, yet when such excessive effusion exists, it may prove fatal in more than one way. It has not very rarely happened that, from the obstruction to respiration, conjoined with the embarrassment of the heart's action due to its twisting and dislocation, death has occurred suddenly; and we have met with the records of several cases in children which had this unfortunate and unexpected termination.

Again, in these cases of excessive serous effusion, if the fluid be not removed either by absorption or paracentesis, there is great danger that the case will be converted into one of empyema, not from the actual conversion of the serum into pus, but from the altered condition of the secretion from the pleural surface.

But even when the fluid does not become thus converted into pus, but remains clear and serous, absorption is very slow, and the patient may perish from exhaustion and hectic fever. During the long time necessarily occupied in the absorption of the fluid also, the pleurisy really becomes less and less curable, since the lung contracts such close and dense adhesions as prevent it from ever fully expanding again. Finally, if any tuberculous diathesis exists, the long course of the pleuritic attack favors very greatly the development of phthisis.

The chief objections which have been urged against the performance of paracentesis in these acute cases are that the effusion will form again requiring repeated punctures and exhausting the patient; that ration prolongs the duration of the case; and that there is of converting the serous effusion into a purulent one.

gard to the first of these, however, experience has shown that r cases a single puncture is sufficient, and that even when the es reaccumulate, it is rarely to such an extent as to demand a on of the operation.

is, again, no reason for supposing that the puncture, if properly ed, can in any way tend to prolong the case. In regard to the ection, the cases recorded sufficiently show that if care be taken ent the admission of air, there is not much reason to apprehend version of a serous into a purulent collection, unless the consti- l condition is so impaired that in all probability the case would ssed into one of extensive empyema, had the operation not been ed at all. Indeed, it is proved by the direct experiments of and Hewson, that air injected into the pleural cavity does not t harm to the serous membrane.

the recent introduction of the greatly improved apparatus for ing paracentesis, also, this source of danger is to a great extent d. By means of Bowditch's instrument, or better still, by one lafoy's aspirators, the effusion can be withdrawn through a so fine that its puncture scarcely creates the slightest irritation, the same time with entire exclusion of air. In this manner, tesis has been performed repeatedly of late years, even in the age of pleurisy, without being followed by any of the unfavor- ults formerly so much dreaded.

ew of the various risks incurred in cases of excessive hydro- Trousseau thus sums up his remarks upon the operation: ever auscultation and percussion reveal the presence of a very ffusion, whether its formation has been attended with acute ms or not, which interferes seriously with respiration, even dyspnœa is not marked; and when this effusion tends to in- despite the active employment of local and general remedies e or ten days, the operation is indicated." He especially directs on to the fact that the mere amount of dyspnœa must not be as a guide, since this may be absent, although there are at the ime evidences of grave interference with the oxidation of the If, however, during the existence of such an effusion, spells of tive dyspnœa should ensue, or syncopal attacks, the operation is y called for.

e *London Hospital Reports* for 1865, these views are warmly ad- l and powerfully supported by Dr. Fraser, who believes that the on should be more generally employed than at present.

have already alluded to the fact that occasionally an extensive will remain serous for a long time, but in the majority of cases, pecially in children, it sooner or later becomes transformed into Indeed, so frequently does this occur, that West expresses his ion that in every case of idiopathic pleurisy in childhood, in fluid is poured out in considerable quantity, the effusion is either originally purulent or becomes so very speedily. In these unfortunate cases, where there is little or no disposition to absorption, where marked hectic fever and exhausting night-sweats soon set in and rapidly debilitate the patient, and where the most favorable result that can be hoped for is that the pus will either evacuate itself externally, or open into the lung and be expectorated, the operation of paracentesis should be undoubtedly performed.

It is evident, indeed, that paracentesis must here have many advantages, since in cases where the pus discharges externally spontaneously, it is almost invariably about the fourth intercostal space, and outside of the nipple, at a point therefore which renders it impossible for the pus to freely evacuate itself, and which thus tends to keep open the fistula for a very long time. Again, it not rarely happens in these cases that the fistula does not lead directly into the pleural cavity, but that the pus has burrowed in the thoracic walls, leading to denudation and necrosis of the ribs or sternum.

The termination by the establishment of a pulmonary fistula, and the evacuation of the pus through the bronchial tubes, is a comparatively favorable one, but yet the case is apt to be more tedious, and certainly the lung tissue must be much more seriously affected than when a free exit is given to the matter by the operation of paracentesis. In these cases, of course, the effusion will almost certainly form again, and either require repeated punctures, or a fistula will be established, through which pus will discharge almost daily.

In addition to the advantage afforded by relieving the system of this source of irritation, and giving the lung a chance to expand, paracentesis enables us also to introduce medicated fluids into the thorax, and thus to modify the diseased pleural surface. We will detail below the injections which appear to us most useful for this purpose.

Although, even under the most favorable circumstances, empyema is a most dangerous and not rarely fatal affection, numbers of cases are on record in which life has been undoubtedly saved by a recourse to this operation, and it has been noticed that the proportion of success is much greater in cases of children than of adults. Thus, out of 46 cases in childhood, 13 of which occurred in West's practice, no less than 35 terminated favorably, there being one death in every 4 cases.

In a recent paper by M. Guinier, of Montpellier (*Bull. de l'Acad. de Méd.*, t. xxx, p. 645; *Bien. Retrospect of New Syd. Soc.*, 1865–6, p. 152), the particulars of 31 cases from different authors are recorded. The patients were of all ages up to 14 years; as many as 16, however, were in their 7th, 8th, or 9th year. In one of his own cases, a rapid recovery was effected in a case of extensive sero-purulent pleural effusion in a nursing child one year old. The mortality was about 1 in 6; and in no instance does the operation appear to have done any harm, but, on the other hand, seems to have relieved suffering and retarded death even in the fatal cases.

One reason of this greater success in early life possibly is, that the much greater mobility of the chest-walls in children allows a rapid contraction of the thorax to occur after the pus has been withdrawn, that the chest-wall comes in contact with the lung, which, in ch cases, is always bound down by dense and strong adhesions; ereas, in adults, the more unyielding character of the thorax main- ins a space between the two layers of pleura for a much longer time. n the other hand, it must be evident that this same greater mobility the chest-walls will enable an excessive pleural effusion to be toler- ed more readily, and with less injurious effect upon the thoracic gans, than can occur in the comparatively rigid adult chest.

The great deformity of the thorax which ensues upon empyema in hildhood is rarely permanent, but as the lung slowly expands, the horacic walls gradually regain their normal shape, the depression of he shoulder disappears, and in the course of a few years at the farthest, carcely any trace of distortion or contraction remains.

Our own opinion in regard to the propriety of this operation, and he indications for its performance, is as follows: in ordinary cases of leurisy in children, with moderate effusion, it is unnecessary. When he effusion is very extensive, and causes marked displacement of the eart, distension of the affected side, and severe disturbance of breath- ng, the question of operating should always be raised, and, if, after onsultation with the parents, it is determined upon in case of necessity, ll preparations for its performance should be made, and we should hold ourselves in readiness to perform it immediately on the appearance f urgent symptoms. Still so long as there is no reason to dread that the case is passing into the stage of empyema, we should recommend a faithful trial for several weeks of the internal remedies, especially digitalis and iodide of potassium, and of the local use of repeated applications of dilute tincture of iodine. In many cases where the effusion has been thus extensive and of quite long standing, we have thus obtained speedy and complete cures, without deformity of the thorax. If, however, positive reduction in the amount of effusion did not soon begin to show itself, we would unhesitatingly operate. Finally, in all cases where the symptoms lead us to conclude that the effusion is more or less purulent, the duty of immediate operation is an imperative one.

In regard to the performance of the operation itself, the chief source of difficulty lies in the necessity of excluding air; though this precaution is only necessary in cases of serous effusion, since where paracentesis is performed for empyema it almost invariably happens that sooner or later the pleural sac communicates with the external air.

The procedure recommended by Trousseau is as follows: The patient being placed near the edge of the bed in a semi-recumbent posture, his body steadied by an assistant, a small incision is made through the skin in the sixth or seventh intercostal space, a little outside the line of the external border of the pectoralis major. An ordinary trocar, the canula of which is protected by a valve of goldbeater's skin, thin gutta-percha, or a piece of animal membrane of any kind, is then placed in this wound and thrust boldly into the pleural cavity, the precaution being taken of grasping the instrument so that not more than one inch shall be free, to avoid all possibility of wounding the lung.

It is preferable, we think, if a simple trocar and canula be used, that a piece of narrow india-rubber tubing should be attached to the end of the canula, and that the trocar should be passed through from the outside of the tube close to the canula, so that after the puncture into the chest has been made, the trocar may be withdrawn, when the little hole in the elastic tube will close and prevent any entrance of air. The free end of the india-rubber tubing should be carried under the surface of some water placed in a vessel intended to receive the effusion as it escapes. Thus we can simply but surely effect the withdrawal of the fluid without permitting the entrance of air. The same result may be attained by the use of a Bowditch's syringe or one of Dieulafoy's aspirators, which act on the principle of a syringe, to be attached to the canula after its introduction through the chest-wall and the withdrawal of the trocar, and so constructed that when the piston is drawn out the barrel is filled with fluid sucked from the chest, but when it is pushed home again, a valve closes the communication with the canula and opens a lateral outlet through which the fluid is forced. Another improvement in the details of this operation, which has a great influence upon the degree of irritation caused by it, is the use of a very small canula for making the puncture.

It is necessary that the thrust given to the trocar should be fearless and quick, since if it be pushed in a hesitating way, the point may push before it the layers of false membrane which probably coat the pleura, and the effusion will not be reached. Should this accident occur, an attempt may be made to break through the false membrane by a probe introduced through the canula, or a second puncture must be made in a different place.

Different opinions exist in regard to the advisability of withdrawing the entire effusion at once, but experience has, we believe, shown that no unfortunate results need be apprehended from so doing. The last portions of fluid which escape are apt to be stained with blood, probably from rupture of the delicate new-formed vessels of the false adhesions.

The dressing of the wound should be as simple as possible, consisting merely of closing the incision by a piece of adhesive plaster, over which a pledget of lint may be secured by a bandage round the thorax.

Almost the only unpleasant symptom which follows the removal of the fluid is spasmodic cough, which often comes on in severe, and at times painful paroxysms. Syncope is scarcely ever noticed, if the patient be kept in a state of absolute rest after the operation. The internal remedies, especially the diuretics, should be continued, and Trousseau recommends, what we have also found useful, that the side should be painted with tincture of iodine.

When we have reason to believe that the effusion is purulent, which, as we have already remarked, is very frequently the case in childhood, there are some points of difference in the operation. Thus we can have no hope that the effusion will not form again, and either require a second operation, or, as frequently happens, cause the cicatrix of the first puncture to re-open. Again, before the case is brought to a successful termination, it is often necessary to employ some medicated injections to alter the character and secretion of the pleural surfaces.

It is doubtful, therefore, whether the admission of a small quantity of air is very objectionable, although West believes that it almost always converts the previous healthy pus into a highly offensive sero-purulent discharge. The ill effects of this can be overcome by the injections to be recommended below; but, on the other hand, care must be taken not to admit so much air as would interfere with the expansion of the lung. It is advisable on the whole, however, to perform the first puncture with the same care, and to employ the same dressing as in the case of serous effusion. But if a second puncture is required, or if the first one re-opens, the wound should be enlarged so as to admit a good-sized canula, which should be allowed to remain. This canula should be of silver, curved so that its extremity may not come in contact with the gradually expanding lung; and its shield should be furnished with a ring of caoutchouc, placed between the instrument and the skin, to prevent excoriation.

After the pus has been withdrawn, the pleural cavity may be washed out through the canula with tepid water, and then there may be injected about an ounce of a mixture of 1 part of tincture of iodine to from 4 to 7 parts of tepid water, effected by the aid of a little iodide of potassium.

The canula should then be closed by a cork, and not disturbed for twenty-four hours, when the accumulated pus should be withdrawn, and a second injection practiced. In the first injections it is better probably to allow the iodine solution to run out again; but after we have assured ourselves of its effect, it may be allowed to remain. Throughout the continuance of the treatment the pus should be allowed to escape at least once every day, though as the secretion diminishes the iodine injections may be practised only at longer intervals, as once in two, three, or four days. The effects of these injections are usually very beneficial; they correct the fetor of the discharge, diminish its amount, and never, so far as we are aware, are productive of pain or increased inflammation. In cases where they appear to have lost their good effects, other agents may be substituted, as weak solutions of carbolic acid, chlorinated soda, or aromatic wine.

In cases which terminate favorably, the discharge diminishes gradually, though often very slowly, the chest contracts, and finally there is nothing left but a fistula, which for a short time discharges a few drops of serous pus before healing. As an example of the tolerance to this treatment shown even by young children, and of the good results finally obtained in many desperate cases, we would refer the reader to the extraordinary case recorded at length in Trousseau's *Clinique Médicale* (t. i, pp. 650–52), where, in a boy of 6 years, the canula was allowed to remain for eleven months, during which time medicated injections were constantly employed. The amount of pus discharged in all is estimated by Trousseau as not less than 80 pounds, and yet perfect recovery finally ensued, and at the date of the report the child's health was excellent.

During the course of such cases, every attention must be paid to sustaining the child's nutrition by abundant nourishing food, stimulus, if needful, bitter tonics, iron, and cod-liver oil.

We subjoin the following case to illustrate the remarks we have made upon the treatment of pleurisy, and to show the importance of faithfully employing suitable internal remedies before resorting to paracentesis, in cases where the effusion is serous and not so excessive as to seriously embarrass respiration.

Case of chronic pleurisy of the left side, beginning with acute symptoms; extensive effusion, with displacement of the heart to the right of the sternum: recovery.—The subject of the case was a boy four years old, of delicate stature and appearance, but enjoying good health. We saw him first at 1 P.M. on February 12th. He was perfectly well the day previous, slept soundly during the night, and rose apparently in good health in the morning. He ate his usual breakfast but complained afterwards of feeling unwell. Soon after this he complained of headache, of soreness and weakness in the knees in going up stairs, and then of violent pain in the left side beneath the armpit.

At the time of our visit, he was in bed, in the following condition: pulse 130, full and strong; skin warm and moist; headache; sharp, severe pain at the præcordia, extending backwards under the armpit, and aggravated by motion, crying, and by deep inspirations; respiration quick and jerking. No cough at all; absolutely none. Abdomen natural; neither vomiting nor diarrhœa. Tongue slightly furred and moist. Action of heart violent; impulse strong and felt over a large space; sounds loud and strong; to the left, and beneath the nipple, a soft murmur with the second sound. Percussion dull over a larger space than natural.

Behind, percussion dull over whole of left side; natural on right side. Respiration natural on the right side; feeble and indistinct, without bronchial sound, on the left.

Ordered a teaspoonful, each, of extract of senna and syrup of rhubarb, to be given immediately; to have a warm bath in the evening, and to take one of the following powders every two or three hours, beginning in the evening:

℞.—Pulv. Opii et Ipecac., ... gr. iij.
Potass. Nitrat., ... gr. vj.
M., et. div. in chart. no. vi.

February 13. Passed a restless night. Better to-day. Pulse 130; softer; skin moist. Impulse of heart less violent. Pain not so severe. Respiration still quick, and when the child is excited or irritated, it becomes jerking, while at other times it is quiet. Physical signs as before, except that the murmur, with the second sound of the heart, is no longer heard. Ordered three ounces of blood to be drawn by leeches from the left side; powders to be continued so as to allay restlessness and pain.

February 14. Has had a better night. Pulse less frequent. Respiration 30, and without jerking; no cough at all; makes no complaints of pain. The appetite is returning.

February 15. Better in all respects; no fever nor pain; no cough. Physical signs as before.

The case went on until the 27th of March, when we paid our last visit, making the whole duration of the case over six weeks. During the last two weeks of February, there were no acute symptoms. The fever had disappeared entirely. The respiration continued, however, from 28 to 30 during all that time. The effusion occupied nearly the whole of the left side, which was manifestly larger than the right, and the intercostal spaces were protruded. Behind, there was total flatness on percussion, from the spine of the scapula downwards, and in front from a short distance beneath the clavicle. The respiratory murmur was absent in the lower three-fourths of the dorsal region, and feeble above. In front, respiration was heard only above and just beneath the clavicle. In the course of this period the heart was gradually forced over to the right side of the sternum, so that at last its impulse was felt, not to the left, but to the right of that bone. The cardiac sounds were loudest and most distinct in the same region. The displacement was so remarkable that the mother discovered it herself, as we had avoided telling her to save her from anxiety. The new position of the heart did not seem to produce any inconvenience in addition to that occasioned by the pleuritic effusion. During the last two weeks of March the child was kept in bed; his diet was milk and bread; a large Burgundy pitch plaster was kept on the side, and he took internally, vinegar of squill and tincture of digitalis.

Finding that the effusion remained stationary under this treatment, we prescribed a grain of iodide of potassium three times a day, in a teaspoonful of compound syrup of sarsaparilla. The diet was changed at the same time. He was allowed small quantities of meat every day, and was taken from bed and placed in a chair by the window. Under this treatment he gradually improved, so that by the 27th of March, when we paid our last visit, the effusion had in great measure disappeared, and he was able to play about the room all day. The side was slightly contracted; the respiration was pure and vesicular, but rather more feeble than on the left side; the heart had returned to its natural position.

We examined this child six years later, and found him to be in excellent health. Excepting a slight contraction of the left side, there was no perceptible difference between that side and the right.

ARTICLE VI.

PNEUMOTHORAX.

In this condition there is an accumulation of air in one or both pleural cavities. The source of this air is either from without, when there is an opening through the chest-wall; or from the bronchial tubes, when there is perforation of the pulmonary pleura. There are a certain number of cases recorded, in which it is supposed by the authors that a secretion of gas has occurred from the pleural surface, or that it has been directly developed from the decomposition of some inflammatory effusion in the pleural cavity; but the evidence upon which the possibility of such occurrences rests is insufficient, and for clinical purposes, at least, it may be assumed that where pneumothorax exists, there has invariably been some communication established between the pleural cavity and the atmospheric air. It is, therefore, to be regarded not so much as a distinct disease, as a complication of many other pathological conditions. There are peculiarities, both as to the cause and symptoms of this condition as it occurs in childhood, which render a separate account of it desirable. It is, however, certainly comparatively infrequent in children, owing in part to the rarity of the injuries and wounds, which often cause traumatic pneumothorax in adults; and in part to the fact that the diseases, especially empyema and tuberculosis with the formation of vomicæ, which are the most frequent causes of it in adults, are either less frequently attended with this complication in children, or are of comparatively rare occurrence.

ANATOMICAL APPEARANCES: Pneumothorax may be found to exist on both sides, but as a mere pathological condition which, of course, must have produced death immediately. It is nearly always limited to one pleural sac, and before the thorax is opened, the affected side is observed to be distended, with prominent intercostal spaces. The percussion-phenomena, which will be hereafter described, persist, and it is sometimes possible by rapidly moving the body, while the ear is placed in contact with the chest, to develop a succussion-splash. If a small opening be made through an intercostal space, the compressed air will often be heard escaping with a hissing sound, and occasionally the current has so much force as to extinguish a lighted candle held near the opening. The air which escapes is usually, but not always, of offensive odor, in consequence of being tainted by the decomposition of the pleuritic effusion which is apt to coexist. If the entrance of air has followed a penetrating wound of the chest, or a compound fracture of the ribs, the familiar appearance of these lesions will be found. More frequently it has depended upon perforation of the pulmonary pleura, in consequence of some morbid action, and we may then detect the spot of perforation, and study its characters, by filling the chest with water and blowing through a tube into the trachea, when a stream of air-bubbles will be seen to rise through the fluid from the point of aperture, unless this has been obstructed by layers of false membrane. The lung itself will be found more or less extensively collapsed, according to the nature of the lesion which has caused the perforation. It can rarely be inflated completely in consequence of the free escape of air through the pleural opening. The adjacent movable viscera are displaced by the pressure of the gaseous collection, even to a greater extent than in many cases of hydrothorax. The position of the perforation in the pleura varies, but is most frequently found at some part of the middle lobes, or the adjacent parts of the upper and lower lobes. We have, however, found two points of rupture in one case, both seated near the apex. The opening itself is usually rounded, or occasionally lenticular; in size it varies from one to three lines in diameter. The edges of the pleura are thin, and often softened and discolored. There may be but a single point of perforation, or several may coexist, either grouped closely together over an abscess of considerable size, or scattered over the surface of the lung (as in the case on the following page), each opening corresponding to a distinct abscess.

The condition of the lung varies exceedingly, and, of course, presents the appearances proper to the lesion which has caused the pneumothorax. Thus there will be found in about the following order of frequency, the appearances, elsewhere described in their appropriate places, of tuberculosis of the lungs (either in the form of softening subpleural miliary formations, or of small superficial vomicæ); of small superficial abscesses resulting from lobular pneumonia; of circumscribed apoplexy or gangrene of the lung; or of vesicular and interlobular emphysema with subpleural bullæ. In most cases, there are evidences of pleurisy associated, and the pleural cavity contains a variable quantity of fluid, either turbid or bloody serum, or ichorous pus; and, at the ame time, the surfaces of the pleura may present patches or organized ayers of lymph. Of course, these appearances will be most marked n cases where the perforation of the pleura has resulted in consequence of a previous empyema. In other cases, the fluids found in the pleural sac have in part escaped from the lung-tissue through the perforation, and are in part due to the pleuritic inflammation superinduced. The irritation caused by the mere admission of air into a healthy pleural sac is not always sufficient to excite inflammation, and thus in rare cases, where pneumothorax results from the rupture of an emphysematous bulla, the pleura may present no inflammatory exudation whatever. But in the great majority of cases, either from the fact that pleurisy coexists, or that there is an escape of pus from the lung at the time of perforation, the pleura presents the appearances above described. It occasionally happens that, owing to the previous existence of pleuritic adhesions over a part of the lung, the escaping air is circumscribed, and produces only a local pneumothorax. In such cases, of course, all the alterations of the thorax, as well as the attendant physical signs, are limited to the seat of the gaseous collection, and may, indeed, be associated with the evidences of chronic pleurisy, with retraction of the remaining parts of the chest. In still other cases, although the pleura has been perforated, the escape of air is entirely prevented by the existence of adhesions of the pleura over the point of rupture; or, as in the interesting case reported on page 222, by the close apposition of enlarged bronchial glands.

The following case, which, owing to the absence of any clinical history, possesses chiefly an anatomical interest, may be given, as showing the usual conditions of a pneumothorax dependent upon pneumonia.

Case.—*Partial Suppurative Pneumonia: Superficial Abscesses, with Subpleural Emphysema: Perforations of the Pleura: Pneumothorax: Miliary Tuberculosis.*—Mary McC., aged 13 months, died February 11th, 1868, after a short illness, during which the most marked symptoms were dyspnœa and cough, with occasional vomiting. At the autopsy, there were all the physical signs present of pneumothorax of the left side. The *right* lung was found congested and partially collapsed, but admitted of complete inflation. In the posterior part of the fissure between the upper and middle lobes, the upper lobe presented a separation of the pleura from the lung to the extent of half an inch in diameter. On the apposed portion of the lower lobe there was a similar large bulla. The lung-tissue immediately subjacent to these cavities was consolidated to a distance of an eighth of an inch. On cutting into the bullæ, they were found to be distended with air and dark sanious pus, and their cavities presented minute trabeculæ and septa, consisting of bronchioles and the remains of ruptured air-vesicles. There evidently was no gangrene of the lung-tissue, so that it appeared that these lesions had resulted from a combination of patches of suppurative pneumonia of the superficial layer of the lung with subpleural emphysema; and it seemed reasonable to conclude from the unusual relations of the emphysematous bullæ, that they were due to the process of softening which had opened a connection between some of the terminal bronchioles, and the subpleural connective tissue. There were scattered miliary tubercles in the upper lobe.

The *left* lung presented two similar but larger bullæ (fully one inch in diameter), in exactly the corresponding position between the upper and lower lobes. There was a small perforation of the pleura in the one in the upper lobe. Two other similar but smaller cavities were found on the surface of the lower lobe, in each of which the separated pleura presented a perforation about one-sixth of an inch in diameter. There were traces of localized pleurisy in the neighborhood, but no adhesions; and a considerable pneumothorax had resulted, causing collapse of at least one-half of the lung.

The bronchial glands, spleen, and kidneys contained miliary tubercles. There was no decomposition of the tissues.

Causes.—Although, as already stated, pneumothorax is a comparatively rare disease in children, it will be found, when present, to occur most frequently in young children (under the age of 5 years), and especially in those of feeble constitution. The causes which directly lead to its development vary greatly in their relative frequency, as compared with the causes of pneumothorax in the adult.

Thus we find that the most fruitful cause of pneumothorax in children is unquestionably tuberculosis of the lungs. In adults this condition leads to perforation of the pleura usually only after the production of a vomica; but, in children, excavation of the lung-tissue to any extent is rare in tuberculosis, and when it does occur is quite constantly associated with such close adhesions of the neighboring pleural surfaces, as would effectually prevent the escape of any air into the pleural cavity, even in event of a perforation of the walls of the cavity. It is found, therefore, that pneumothorax more frequently results from the softening of small superficial tubercles, which involve the pleura and lead to its softening and perforation.

The next most fruitful cause of pneumothorax in children is probably pneumonia, when it passes on to the stage of suppuration with the formation of a superficial abscess, which seems most likely to happen when the inflammation occurs in a localized and circumscribed form. The three cases with which we have ourselves met were all due to this cause. It is probable that this unfortunate termination is much more frequent in secondary pneumonias (especially those following such diseases as measles, or, as in one of our cases, severe remittent fever), and, in a number of the cases, miliary tubercles have been found associated, as in the instance quoted above by us. In such cases the plastic exudation formed on the pleural surface is often too small to prevent the escape of air after the perforation has occurred.

Gangrene of the lung and the softening of superficial patches of pulmonary apoplexy, are mentioned by several authors, particularly by Rilliet and Barthez, as following next in order of frequency. But, according to our own observation, empyema, with consequent ulceration of the pleura and communication with the bronchi, although not so frequent a cause of pneumothorax in children as in adults, yet furnishes more cases than either of the former rare conditions. Occasionally, also, when the purulent fluid in empyema has discharged itself externally by an ulcerated opening in an intercostal space, air has found entrance to the pleural cavity, and produced a pyo-pneumothorax.

Finally, pneumothorax has been known to follow the rupture of a subpleural bulla in cases of interlobular emphysema. It is especially in such cases that the collection of air may be found without any coexsting liquid effusion. It is probable, however, that were life to be prolonged after such an occurrence, some pleural inflammation would be established, and lead to serous effusion.

In most cases the actual perforation of the pleura is the result of the progress of the pulmonary disease which has ultimately involved the serous membrane in its course; but it is probable that the rupture may be at times precipitated by any violent effort, particularly by a fit of coughing or severe vomiting.

SYMPTOMS.—In some cases where the antecedent disease is a very grave one, and the strength of the child is greatly reduced, the supervention of pneumothorax is with difficulty detected, and death occurs from the sudden increase of obstruction to the respiration before an opportunity is afforded for careful examination.

The occurrence of the perforation is often marked by an abrupt and decided increase of the dyspnœa which has already existed in consequence of the preceding disease. It will, however, be readily understood that this increase in oppression is not of such constant occurrence in children as in adults, owing to the fact that in the former all acute diseases of the chest are apt to be attended with an extreme degree of dyspnœa. So, too, the sharp lancinating pain usually complained of by adults at the time of the development of pneumothorax may be latent, or only revealed by increased agitation and more hurried, shallow breathing. In some of their cases, Rilliet and Barthez observed a cough which they considered peculiar, and described as "short, frequent, jerking, painful or convulsive, and sharp or piercing;" and a similar cough has been noticed by other observers.

In cases where death does not occur very quickly, and where a careful examination of the chest can be secured, the physical signs of pneumothorax are much more characteristic than the general symptoms. The affected side is distended, and its intercostal spaces bulge slightly. The respiratory movements are overactive on the opposite side to atone for the marked impairment of motion of the affected one. Percussion over the seat of the pneumothorax gives either merely exaggerated resonance, or a tympanitic or amphoric sound. Frequently this morbid resonance will be found associated with dulness upon percussion in some parts of the thorax, owing to the coexistence of consolidation of the lung or of pleuritic effusion. It may also happen that if the distension of the affected side be extreme, the tympanitic resonance will grow more or less flat, owing to the overtension of the thoracic walls. According to the condition of the lung and the character of the opening in the pleura, the respiratory murmur may be absent, or be present as metallic bronchial breathing, or more frequently as pure amphoric breathing. The vocal fremitus has generally been found decidedly diminished. Metallic tinkling has been detected in several instances; it was observed by Barrier to be most distinct during the effort at coughing. We are not aware that a splashing sound, such as can so frequently be developed in cases of pneumothorax in the adult, by succussion, has yet been observed in children.

The adjacent movable viscera are found to be displaced by the pressure of the gaseous accumulation, especially in left-sided pneumothorax, where the dislocation of the heart to the right is very marked. Of course, if the pneumothorax be circumscribed, the above physical signs will be limited to the same spot.

It will thus be seen that the symptoms of this condition in children closely resemble those which it presents in the adult; but that in many cases it is impossible, owing to the great agitation of the child, to fully demonstrate their existence.

Course—Prognosis.—The course of pneumothorax in children is usually a rapid one. Occurring as it does, as a complication of some serious pre-existing disease of the lung, it so increases the respiratory embarrassment as to generally induce death in from a few hours to a few days. In rare instances only is life prolonged for a few weeks. The prognosis, although regarded by Rilliet and Barthez as, on the whole, less unfavorable than in the same condition in adults, is still exceedingly grave, both from the serious character of the condition itself and from the grave nature of the diseases (tuberculosis, secondary pneumonia, gangrene of the lung, interlobular emphysema) in whose course it occurs as a complication. Rilliet and Barthez observed one case where recovery ensued after the positive signs of pneumothorax had persisted for twenty days in a boy 3 years of age. They regarded the case as originally one of pneumonia.

We have also observed a case, in a boy 11 years old, during an attack of secondary pneumonia, complicating a severe bilious remittent fever, where complete recovery ensued, though after a most violent illness; and it would indeed seem that, with the exception of the comparatively rare traumatic cases, the prognosis of pneumothorax in children is most favorable when it occurs in this connection.

Steffen (*Klinik d. Kinderkrankheiten*, bd. i, p. 137, *et al.*) expresses this opinion also, and places as the next most favorable variety that which is associated with empyema. Although it might be expected that pneumothorax resulting from the rupture of emphysematous bullæ would be of favorable prognosis, on account of the trifling amount of pleural inflammation which often attends that lesion, the fact is that this condition of the lungs themselves is so serious that a fatal result has followed in all cases so far recorded.

In regard to the *diagnosis*, it is quite true that the occurrence of pneumothorax in the course of one of the thoracic diseases which we have seen it may complicate is apt to be overlooked, either owing to the want of symptoms definite enough to arouse suspicion of the development of some new lesion, or to the difficulty of securing a careful physical examination of the chest. When, however, this physical exploration is made with the frequency and care which are demanded in every case of acute thoracic disease, especially when threatening symptoms exist, the characteristic physical signs will be determined, and can scarcely be attributed to any other than the true cause.

Treatment.—The management of pneumothorax must be considered always with reference to the primary disease which it complicates, and its occurrence must not be allowed to interfere with the prosecution of the treatment necessary for this. As it is evident, however, that this additional lesion will still further tax the vital powers, and as the only chance of recovery lies in maintaining life till the cause, if curable, is removed and the air absorbed, we would advise that all remedies capable of reducing the strength or disturbing nutrition should be discarded, and that by every means the system should be sustained. In addition, we should recommend the moderate use of sedatives—either in the form of the preparations of opium or hyoscyamus, associated with bromide of ammonium if the cough be very severe and paroxysmal, to quiet agitation and excessive dyspnœa, and to relieve the cough. If the distension of the affected side and the pressure on the surrounding organs be great, and the evidences of impeded circulation and oxidation of the blood are threatening, recourse may be had to puncture through an intercostal space with a very fine trocar. Although the results of this operation must be regarded as palliative rather than curative in most cases, yet as the paracentesis itself is attended with no danger, its performance is to be recommended whenever the signs of pressure from the accumulation of air in the pleural sac become alarming. It is especially in cases where there is a liquid effusion associated with the gas (constituting a hydro- or pyo-pneumothorax) that paracentesis will afford most relief. In one case of this kind, Hennig performed paracentesis, evacuating a large amount of purulent liquid and gas, with very great relief to the symptoms of oppression. The child, a boy of 4 years of age, lived four weeks after the operation, and then sank from exhaustion.

ARTICLE VII.

HOOPING-COUGH, OR PERTUSSIS.

Definition; Synonyms; Frequency.—Hooping-cough is characterized by a hard, convulsive cough, occurring during expiration, and accompanied by long, shrill, and laborious inspirations, which are called hoops. The cough occurs in paroxysms, which are terminated by the expectoration of tough phlegm, and often by vomiting.

The disease is known by various other names, of which the most common are tussis ferina, chincough, and kincough. The *frequency* of the disease is exceedingly variable, as it occurs both in the sporadic form and as a widely-prevailing epidemic. Some idea of its frequency may be gained from the facts that, during the five years from 1844 to 1848, inclusive, there were 390 deaths from it in Philadelphia, under 15 years of age, out of a total mortality of 31,162. During the five years from 1864 to 1868 inclusive, there were, out of a total mortality of 76,354, 543 deaths from hooping-cough; a proportion considerably smaller than that during the first period of five years above mentioned. The irregularity is even more strikingly seen by comparing single years with each other: thus, while in 1867, there were but 6 deaths from this cause, there were no less than 208 in 1862.

Causes—Age.—It occurs generally in children, and may be met with in the first weeks of life; indeed, Watson in his lectures, mentions a case where the mother, during the last week of her pregnancy, lived in a house where the disease was prevalent, and her infant hooped the very day it was born. Of 208 cases in children, in our own private practice, 26 occurred in the first year of life, 147 between the ages of 1 and 7 years, and 35 between 7 and 12 years. To be more explicit, we will state that of 188 cases in which the age was accurately noted, 11 occurred in the first six months of life; 9 between 6 and 12 months; 30 in the second year; 17 in the third, 32 in the fourth, 17 in the fifth, 30 in the sixth, 16 in the seventh, 13 in the eighth, 8 in the ninth, 3 in the tenth, and 1 in the eleventh and twelfth years of life each. Of 130 cases in children, collected by M. Blache, 106 occurred between 1 and 7 years of age, and only 24 between 8 and 14. Of 29 cases observed by MM. Rilliet and Barthez, there were 26 between 1 and 7 years, and 3 between 8 and 12. It is stated by MM. Blache, Rilliet and Barthez, and Valleix, to be most common in girls. Of 208 cases observed by ourselves, 106 occurred in boys, and 102 in girls. Some writers have asserted that certain *constitutions* and *hereditary influence* predispose to the disease. So far as our own experience goes, it has seemed to attack indifferently those who were simultaneously exposed to it. The fact of its being propagated by direct *contagion* is proved beyond doubt by numerous observations. We have rarely known one child in a family to be attacked without its extending to all the others not protected by having had the disease previously. That it often appears also in the form of an *epidemic*, is established by the testimony of many writers, so that at present no doubt is entertained upon this point.

Symptoms.—It is customary to describe three stages of hooping-cough. The first is called the stage of invasion, or the catarrhal stage; the second the stage of increase, or the spasmodic stage; and the third the stage of decline, which is characterized by an amendment of all the symptoms.

First Stage.—The great majority of the cases begin with the ordinary symptoms of simple catarrh. These are coryza, sneezing, slight injection of the conjunctivæ, and dry cough. The cough rarely has any peculiarity in the beginning which will enable us to distinguish it from that of an ordinary cold, though some persons have asserted that they could recognize it. We have often listened with great care to the sound of coughs which parents supposed might be hooping-cough, but were always obliged to confess our inability to determine, until time gave them more decided characters. In addition to the symptoms enumerated, there is generally more languor, lassitude, drowsiness, and irritability, than are commonly present in simple catarrh. In a small proportion of cases the first stage is wanting, and the disease assumes its peculiar features from the first. The duration of this stage is very uncertain, and is ascertained with difficulty. Our own experience would fix it at about two weeks as the average, though it may last undoubtedly a much shorter or longer period. The earliest period at which we have known the distinctive hoop of the disease to be heard was in three days. In another case it was five days. We have also known it to appear at a later period than usual. In a good many instances it has been as late as three weeks, but very rarely later.

Second Stage.—At the beginning of this stage the disease has assumed its peculiar convulsive and paroxysmal character. It consists of violent fits or paroxysms, or as they are often called, kinks of cough, recurring after longer or shorter intervals. Just before the paroxysm the child seems restless, anxious, and irritable, or else keeps perfectly quiet and evidently tries to retard its approach. When it begins, the child, if lying down, rises up suddenly, or if playing about runs to take hold of some fixed object, by which to support itself during the accession. The cough is dry, spasmodic, and sonorous, and occurs in a succession of short, rapid expirations, by which the thorax seems to be emptied of all its air with violent efforts. It is followed by one or two long and deep inspirations, which are accompanied by the peculiar hoop to which the disease owes its name, and which is caused by the drawing of the air rapidly and forcibly through the narrowed glottis, which is spasmodically closed. During the fit the face becomes deeply suffused or even purple, and swollen; the eyes are watery, and the countenance is expressive of great anxiety, and after the fit is over, of fatigue and exhaustion. The latter symptoms are, as M. Valleix remarks, the signs of partial asphyxia, and are the result doubtless of the complete expulsion of air from the thorax, and a consequent partial suspension of the function of hæmatosis. There is almost always an expectoration of colorless ropy fluid, often accompanied by vomiting, at the close of the fit of coughing, and the patients usually appear weak and languid for a short time, after which they return to their play.

In very severe cases there are other symptoms in addition to those just mentioned. *Hemorrhages* from the mouth, ears, nose, lungs, and beneath the conjunctivæ, are not unusual. We have ourselves seen several instances of epistaxis, one of effusion into the eyelids, a few of extensive subconjunctival ecchymosis, and we are well acquainted with the history of another case, in which there was bleeding both from the nose and ears. In one case, in a girl between five and six years old, that occurred to one of ourselvés, in which the paroxysms were violent, the spells were accompanied in the latter half of the fourth and in the fifth week, by a discharge of a good deal of blood from the mouth. This took place particularly during the night-spells, so that in the morning the basin would contain several teaspoonfuls of blood.

It was not from the nose. It was bright in color, pure, except that it was intermingled with sero-mucous expectoration, but it was not intimately blended with the sputa, nor was it streaked through the mucus as it sometimes is in the pneumonia of children. On one occasion it was seen to fly from the mouth in a little spirt, as though from a vessel. The child was lively and well all this time, playing about, eating well, strong, not thirsty, without pain, not oppressed between the spells, and sleeping naturally between the paroxysms at night. The only altered physical sign was slight dulness on percussion over the upper part of the right lung behind, with some subcrepitant râle at that point, but without bronchial respiration. After lasting twelve days, it ceased; the child got well gradually, and continues strong and hearty to the present time. In another case, in a girl two years of age, which came under our own observation, a species of syncope, a state of insensibility, without convulsive movements, accompanied by great paleness, occurred after many of the paroxysms.

We have met with general *convulsions* in 12 cases, 5 of which proved fatal. In 2 other cases, both occurring in infants under six months, the paroxysms of cough were accompanied by the most violent struggling and oppression, and by deep blueness of the hands and feet, like that of severe cyanosis.

In some instances, after the paroxysm is apparently over, the child will begin within a few instants to cough again, and may in this way have several fits in such rapid succession as to make an almost continuous paroxysm. It is quite common for this to happen twice, and in one case which we saw, it occurred three times on several occasions. The ordinary *duration* of a paroxysm or kink, is from a quarter to three-quarters of a minute, though it may last as long as two minutes, or according to some even longer. In a case that occurred to ourselves, one paroxysm lasted the extraordinary period of fifty-five minutes. That it was really a paroxysm of the disease, we are quite sure, as it chanced that we reached the house shortly after it began, and witnessed the greater part of it ourselves. The number of accessions in twenty-four hours is very irregular. It depends chiefly on the stage and violence of the attack. During the height of the disease, we have generally found them to number about 40. In some rare cases, however, they are much more numerous, and amount to 70 or 80. They are generally most frequent in the course of the third or fourth week, after which they remain stationary as to frequency for several days, or for two or three weeks, and then decline gradually. The paroxysms may occur spontaneously, the child being often disturbed from sleep by their sudden occurrence, or they may be excited by various circumstances, such for instance as contrarieties, a fit of crying, change of position, eating, violent exercise, and imitation. We have frequently seen an attack brought on by the sight of another child in a paroxysm of the disease. The duration of the second stage may be stated to be about 30 or 40 days in most cases.

Third Stage.—It is impossible to fix a precise limit from which to date the beginning of this stage. It is generally, however, said to commence from the time when the disease is evidently on the decline. The paroxysms now grow less frequent and less violent, the cough reassumes some of the catarrhal features which it had at first, and gradually loses its peculiar spasmodic character. The child's general health improves, the appetite becomes vigorous, the strength is invigorated, the sleep again becomes sound and tranquil, and the disease disappears. The *duration* of this stage is uncertain, like that of the two others. MM. Rilliet and Barthez state it to be short in uncomplicated cases (ten to fifteen days), and are of opinion that when it has been supposed to have lasted several weeks or months, it has been the result of some complication, as chronic dilatation of the bronchia, tubercular disease, &c. It happens not unfrequently, however, that after the disease has apparently ceased, all the distinctive characters of the cough recur, if the child chance to take cold within a few weeks or even longer after its disappearance.

In cases of pertussis unaccompanied by complications of any kind, there are no marked *general symptoms*. There is seldom any fever, the appetite continues good, and with the exception of occasional languor and fatigue, and irritability of temper, the child appears to be well.

Urine.—No accurate analyses of the urine in pertussis appear to have been made. Gibb and Johnston, however, state that they have found sugar in variable quantities in almost every case. This question appears well worthy of full investigation, since, if this statement is confirmed, it would link itself in the most interesting manner with the other evidences in this disease of irritation of the pneumogastric nerves, which are at least somewhat concerned in the glycogenic function of the liver.

The *total duration* of the disease, in simple cases, may be set down at from one to three months. We have never known a case to last so short a time as a month, and have rarely found the whole duration much within three months.

COMPLICATIONS.—Though it has happened to us, on several occasions, to meet with children who have been very ill from the violence of the disease under consideration in its uncomplicated condition, we have never known a case to prove fatal except in consequence of some kind of complication. It is exceedingly important, therefore, that the various accidents apt to occur in the course of the disease should be carefully considered.

Convulsions.—This complication is not a rare one, since it occurred in 5 of 29 cases observed by MM. Rilliet and Barthez, and in 12 of 208 observed by ourselves. It is one of the most dangerous accidents liable to occur in the course of the disease. Of the 7 cases reported by the authors quoted (5 of their own, and 2 belonging to M. Papavoine), 6 died. Of our 12 cases, 5 died. In all that we have seen, the convulsions were general, extremely violent, and accompanied by insensibility in the fatal cases to the last, and in the favorable ones, during from a few minutes to half an hour. In two of the fatal cases the pertussis had lasted nearly two months, and was accompanied by extensive bronchitis. The fatal event took place within twenty-four hours from the supervention of the spasms. The subjects were eight and nine months of age respectively. In the third case, the convulsions came on in the seventh week of the disease, in a child who had been laboring for a number of days under bronchitis. They ended fatally in seven hours. In the fourth they occurred in a child in the second year of its age, at the end of about four weeks, proved fatal in two days, and were caused by bronchitis and collapse of the lung-tissue. In the fifth case they occurred likewise in a child in the second year of life, were attended with violent laryngismus and contraction, and proved fatal in the third week of the disease.

One of the favorable cases occurred in a child five months old, who had been attacked with bronchitis three days before the occurrence of the convulsions, which came on during the height of a severe paroxysm of coughing. The convulsive movements were general, and continued for about half an hour, after which the child was drowsy or irritable for some hours longer. The hooping-cough continued to be severe for two weeks after this, as many as 42, 46, and 48 paroxysms occurring every day. At last, however, perfect recovery took place. The second favorable case was that of a girl between two and three years old, in whom a convulsion occurred in the third week of the disease, before the paroxysms had become violent, and evidently in consequence of an attack of fever dependent upon dentition. The seizure lasted only a few minutes, was followed by drowsiness for a few hours, but on the following day all the unpleasant symptoms had disappeared. In a third case, in a boy between two and three years old, a violent convulsion occurred at the end of the second week, at the beginning of an attack of pneumonia. The child remained very ill, and nine days afterwards had another convulsion, which was much slighter than the first. After this he gradually recovered. In a fourth case, in a girl between two and three years old, a slight but well-marked convulsion occurred at the onset of an attack of bronchitis, which took place at the beginning of the third week of the hooping-cough. The bronchitis proved to be very severe, but there was no return of the spasm, and the child recovered. In a fifth case, in a boy nine months old, a severe fit occurred in the sixth week, just after the child had been brought home from an expedition to procure his daguerreotype. It lasted fifteen minutes, and was attended with total insensibility, and purple discoloration of the face, but in half an hour after, the patient was nursing well, and was entirely conscious. There was no return of the convulsions, though the disease was very severe after this attack. In the sixth case, also in a boy nine months old, a slight convulsion occurred during one of the paroxysms in the fifth week, but was not followed by any bad consequences.

Amongst the complications ought to be ranked, we think, though this has not generally been done by writers, an excessive degree of the laryngismus which constitutes one of the natural and essential features of the disease. In some children, in fact, and especially in those of a nervous temperament, and in the anemical and debilitated, and, likewise, in certain epidemic types of the disease, this laryngismus assumes a degree of severity which is not only distressing but positively dangerous. In one case that occurred to ourselves, in a child who had suffered many months before from laryngismus and contracture, the occurrence of hooping-cough reproduced the laryngismus, and after a few weeks caused death almost instantaneously, at the beginning of a paroxysm, as the child was sitting upon the floor, where it had been placed only a few moments before to play, it having presented before this no very threatening symptoms. In another case, in which we could detect no other complication, the spasm of the glottis was so very violent, that after a few days the spells were attended with convulsions, and very soon ended fatally. In a third, this symptom was so violent that in many of the spells the child ceased for the time to breathe, seemed to faint, became entirely unconscious, and had to be fanned and carried to an open window to be revived; this patient ultimately recovered. In a great many cases, this symptom, without other complication, has been most distressing, and has required particular treatment.

Collapse of the Lung-Tissue.—The recent discoveries in regard to the pathological change in the pulmonary tissue called collapse, and especially a consideration of the causes by which collapse is produced, might well lead us to suppose that pertussis, and especially the bronchitis of pertussis, would be very apt to become associated with collapse. Late researches accordingly show that of all the lesions met with in hooping-cough this is much the most frequent and important. Dr. Graily Hewitt, of London, in a lecture on the pathology of hooping-cough, read before the Harveian Society of London, in 1855, shows "that the catarrhal inflammation of the bronchial tubes, which occasions hooping-cough, is, in fatal cases, attended almost universally with collapse of the lungs." He states that his observations were made upon nineteen subjects, whose age varied from four years to one month, the average being eighteen months. "In all, the state of the lungs was carefully noted. The chief lesion found after death was collapse of the lung-substance. The following is a statement of the degree to which this pathological condition manifested itself in the different lobes of the two lungs.

"In the *right lung*, portions of the upper lobe were found collapsed in six cases, and in four more to a less degree. The middle lobe was collapsed, wholly or in part, in sixteen cases. The lower lobe was more or less affected with collapse, in eighteen cases. In the *left lung*, the upper lobe presented the same lesion in fifteen cases, the whole of the anterior tongue-like prolongation being in most of the cases affected. The lower lobe was collapsed more or less in eighteen cases. In seven of the cases, the portions collapsed were also congested, in some to a high degree.

"The test of MM. Bailly and Legendre, viz., the inflatability of the portions of the lung thus affected, was used in almost all the cases;

and on that and other grounds, it was determined, that the particular part of the lung in question was collapsed and not hepatized.

"It will be at once perceived, that the occurrence of collapse was almost universal; all the cases, with the exception of one, in which there was extensive tuberculization of the lungs, presenting a greater or less amount of lung-substance affected in this manner."

We have had but few opportunities of testing this matter for ourselves by post-mortem examinations; but in one case to which we were called in consultation, that of a boy not quite a year old, this lesion was shown, by autopsy, to be present to a great extent. The child had had the disease during three months with considerable severity. He was thought to be doing well, until he was taken one day a long drive into the country. After the ride he seemed very much fatigued, and that night was seized with very great dyspnœa, increased violence of the coughing spells, and after a short time with general convulsions. We saw him on the following day. He was breathing very rapidly and with much effort, there was a good deal of subcrepitant râle through the chest, the skin was cool, and about the mouth had a cyanotic tint, and he was unconscious. The same symptoms persisted through the day with occasional convulsive seizures, and on the following day he died. At the autopsy, there was found very extensive collapse of both lungs, as proved both by the anatomical appearances, and by inflation. There was no pneumonia, and very moderate bronchitis.

Bronchitis has always been supposed to be the most frequent complication of hooping-cough, and there can be no doubt that it is one of the most important. The recent discoveries of the existence and nature of collapse have shown, however, that many of the fatal cases, hitherto ascribed to bronchitis, or to bronchitis and pneumonia combined, must have been cases of collapse, so that large allowances must be made for all statistics collected before the discovery of the true nature of the last-named lesion.

There is, as has already been stated, a certain amount of pulmonary catarrh in every case of hooping-cough. This is a normal element of the disease. To constitute a complication there must be a true bronchitis, an inflammation of the bronchial mucous membrane, sufficient to produce the ordinary symptoms of that disease. This exists in a great many cases; MM. Rilliet and Barthez found it to exist either alone or combined with pneumonia in half of the fatal cases. Of the 208 cases observed by ourselves, it existed to a greater or less extent in 42. In 28 of these it was mild or only moderately severe, and of these all but one recovered. In 14 it was severe and very extensive, or else capillary, and of these 6 died. Of the fatal cases, it was in several no doubt attended with collapse of the lung-tissue. In fatal cases, it has often been found accompanied by continuous dilatation of the smaller bronchia.

Pneumonia, according to the authors above quoted, is about as frequent as bronchitis. When, however, the fatal termination took place soon after the beginning of the disease (18th, 26th, or 27th days) it was not generally present. After these periods, on the contrary, it was almost always observed. As these authors, however, include under the title of lobular pneumonia, many cases of bronchitis with collapse, it is clear that a large number of their cases of supposed pneumonia ought to have been ranged under the head of bronchitis. For our own part, we have met with only five well-marked cases of pneumonia. Two of these occurred in girls of seven and nine years old respectively, one in a girl between one and two years of age, a fourth in a boy between two and three years old, and a fifth in a boy in his ninth year. They all recovered. The degree of danger from this complication is in proportion to the earliness of the age at which the disease occurs, and to the extent of the inflammation.

Emphysema undoubtedly follows or accompanies hooping-cough in some cases. In a considerable proportion of fatal cases the lesions of vesicular, and, less frequently, of interlobular emphysema are discovered. These will be found described in full in our article upon the latter affection, where we have also alluded to the rare occurrence of emphysema of the subcutaneous tissue of the neck, and even of the entire body, as a consequence of the free escape of air into the connective tissue of the lung, and thence into the mediastinal spaces. It is, therefore, probable that, in cases of pertussis which end favorably, but in which the paroxysms of cough have been severe, a less degree of emphysema occurs, which in most instances speedily passes away after the disappearance of the primary affection. Indeed, as nearly all the children whom we have attended with hooping-cough, continue under our charge, and as only in a very few cases do any symptoms of emphysema persist, we must conclude either that it less frequently attends pertussis than would naturally be supposed, or else that the lung-tissue soon regains its elasticity, and the over-distension of the air-vesicles disappears. In some instances, and especially in those where chronic bronchitis follows the attack of hooping-cough, all the symptoms of emphysema may gradually develop themselves.

Vomiting is a very frequent incident in pertussis, but ought not to be regarded as a complication, unless dependent on some disease of the digestive organs, or symptomatic of cerebral disease. Where it occurs in simple cases, or in those complicated with bronchitis or pneumonia, it has always seemed to us to be advantageous.

Tuberculosis and *scrofula* are not infrequently found to follow hooping-cough, in cases where a marked predisposition to these conditions exists. The tuberculous affection is most apt to take the form of pulmonary or bronchial phthisis. These sequelæ are frequently observed in hospitals, and among the ill-fed and feeble children of the poor, but are comparatively rare among the better classes of society.

Diagnosis.—The diagnosis of pertussis is difficult only during the first stage of the complaint. It is impossible, indeed, to distinguish, during that stage, between it and simple mild laryngitis, or the mild catarrhal attacks which are so common in our climate. After it has once fairly entered upon the second stage, it is scarcely possible to confound it with any other malady. MM. Rilliet and Barthez state, however, that acute bronchitis with paroxysmal cough is not unfrequently mistaken for pertussis, and we recollect perfectly having made this mistake ourselves, in a little girl, five years of age. The cough assumed so exactly the features of pertussis, that after waiting a few days we announced, authoritatively, the presence of pertussis. Only three or four days after this we were forced to take it all back, for the whole thing had disappeared, bronchitis, pertussis, and all. The patient was entirely well. But the mistake need seldom be made, if it be recollected that in acute bronchitis with paroxysmal cough, the invasion is sudden; that there is violent fever, great dyspnœa, and the physical signs of bronchitis; that the hoop is generally wanting, or feebly marked, and that the disease is violent and rapid in its course; all of which circumstances are widely different from what occurs in pertussis.

The same authors assert that tuberculosis of the bronchial ganglions gives rise to a cough which may be mistaken for pertussis. The following table extracted from their work will show the differences between the two disorders:

PERTUSSIS.	TUBERCULOSIS OF THE BRONCHIAL GANGLIONS.
Often epidemic, attacking several children at once; transmissible by contagion.	Always sporadic; non-contagious.
Three distinct stages, of which only the second is accompanied by kinks.	No distinct stages.
Kinks attended with hooping, ropy expectoration and vomiting.	Kinks generally very short, without hooping, ropy expectoration, or vomiting.
Pure respiration in the intervals between the kinks.	Physical signs of tuberculosis of the ganglions; but, in certain cases, absence of these signs.
In the intervals between the kinks, respiration and pulse natural, so long as the disease is simple.	Accessions of asthma in some cases, with the kinks; continuous febrile movement, with evening exacerbations, sweats, progressive emaciation, &c.
Voice natural.	Voice sometimes hoarse.
Course generally acute.	Chronic course.

PROGNOSIS.—Pertussis is rarely a dangerous or fatal disease so long as it remains simple. Of the 208 cases observed by ourselves, 143 were simple, all of which recovered. Nevertheless even the simple disease does sometimes terminate fatally, from the excessive violence of the paroxysms of coughing.

The danger in hooping-cough, which is considerable, depends, therefore, almost entirely on the complications which are so apt to occur, for which reason the physician should watch with the closest attention, in order to prevent their occurrence, and that he may recognize and treat them in their earliest stages. The most dangerous complication is convulsions, and after that bronchitis and pneumonia. So long as the child seems well and lively, and without fever or dyspnœa, in the intervals between the fits, there is nothing to be feared. But if, on the contrary, it becomes languid and irritable, with indisposition to take food, feverishness, and some increase of the rate of respiration, the practitioner should be upon his guard. A very early age and natural delicacy of constitution, are unfavorable circumstances in the disease. Some form of complication occurred in 65 of the 208 cases observed by ourselves. Of the 65, 12 died.

Five of the 12 fatal cases ended with convulsions. Of these 5 cases, the convulsions were caused by bronchitis and collapse of the lung in 4, the fatal result being the consequence, in fact, of the lung complication. One of the cases was independent, apparently, of disease of the lung (though, as no post-mortem examination was made, this cannot be asserted positively), but seemed to be the result of the violent laryngismus, with contracture and general convulsions, such as will be described in the article on laryngismus stridulus. Two of the cases occurred in children of eight and nine months old, respectively, and proved fatal in twenty-four hours after the setting-in of the convulsions. Two others occurred in children in their second year, and the fifth occurred in a boy between three and four years old, and caused death in seven hours.

Of the remaining seven fatal cases, one was the result of collapse of the lungs, supervening suddenly upon a mild bronchitis, in a twin child between two and three months old. The second was caused by tubercular disease of the lungs, in a child between three and four years old, and the remaining five by bronchitis, associated, to a greater or less extent, in all probability, with collapse of the lung. Of the last mentioned five cases, one occurred in a child between five and six months old, and was rapid in its course; two occurred in children between one and two years old, one being rapid and the other lingering in its course; one occurred in the third year of life, and was attended with severe diarrhœa from teething, as well as with bronchitis and collapse; and the fifth occurred in a child in its fourth year, and was slow and gradual in its course. To sum up, it may be stated that of the 12 fatal cases, 10 were the result of bronchitis and collapse, 1 of tuberculosis of the lungs, and 1 of laryngismus stridulus.

NATURE OF THE DISEASE.—There is no essential anatomical lesion in pertussis, except, perhaps, slight inflammation of the bronchial mucous membrane. In most of the cases, the membrane lining the larger and smaller air-tubes, and very rarely that of the trachea, is reddened and perceptibly thicker than natural, and the tubes contain a considerable quantity of frothy mucus, or a thick, viscid, and tenacious phlegm.

As to the nature of the disease, it seems to us very clear that it ought to be regarded as comprising two elements of morbid action, one of which consists in slight inflammation of the respiratory mucous membrane, and the other of disordered action of the respiratory system of excito-motor nerves. It is neither a pure neurosis nor a pure inflammation, but partakes of the characters of both, and much more of the former than of the latter. The authors of the *Compendium de Méde-*

cine Pratique (t. ii, p. 526) regard it as a neurosis, on the foll
grounds: "1. In the greater number of cases the respiratory appa
presents no kind of alteration, or else the lesions are so multipli
variable, that they are surely not the real origin of the diseas
The clearly remittent course of the symptoms, and the total ab
of fever, unless some complication is present, are not observed in
nary or even specific inflammations. 3. The cessation or sudden r
of the paroxysms, under the influence of moral emotions or chan
place, belong to a disorder of innervation, and not to inflamm
which commonly passes through certain stages before it is res
4. The complete return to health, the integrity of all the functio
slight cases, the resistance which it opposes to treatment, the us
ness of antiphlogistics, and the success obtained from narcotics
antispasmodics, are all so many circumstances peculiar to hoo
cough and to many of the neuroses."

It has, however, so many points of resemblance to the various
stitutional diseases, as its undoubtedly contagious nature; the
that it runs a definite course, and that one attack protects the sy
against a second; that it also probably depends upon a morbid
of the blood, due to the introduction of some specific poison w
possesses the peculiar power of irritating the pneumogastric nerv

TREATMENT OF SIMPLE PERTUSSIS.—Hooping-cough, like all
diseases, varies greatly in its degree of severity. It is sometim
affair of no consequence scarcely, the patient passing throug
stages without suffering, and without any injurious consequences w
ever to the general health. We have known a large family of chi
to pass through the disease without other treatment than attenti
a prudent hygiene, and with no other medicine than a few doses
mild cathartic, given to relieve some uncomfortable gastric symp
We have known one child in a family where the disease was pr
ing at the time, to have the cough for only five weeks, and to
only on two or three occasions, and to lose neither appetite nor s
for a moment. Such cases evidently need no interference, and a
physician will, in such, order no drugs. His business will be simp
direct that the child be guarded against cold and against imprud
in diet.

In other instances the disease assumes, from a very early peri
sometimes not until later, a character of a very different kind. W
out any complication whatever, the natural symptoms of the di
develop in great intensity. The spells of coughing are very freq
very violent, and very long-continued. Instead of some twenty
or less in twenty-four hours, as is the rule in mild and moderate
the patient will average two or more every hour, having fifty or
spells in the day. The laryngismus, instead of being slight, wi
violent and distressing, so that in lieu of three, four, or five hoops
paroxysm, there may be fourteen or fifteen, and these so shrill, a
and prolonged, as greatly to exhaust the poor little patient. O
laryngismus may be so intense as to close for a few seconds the gl

and arrest entirely the respiration, giving rise to the most painful attacks of struggling and suffocation possible to behold. Or the vomiting may be so frequent as seriously to interfere with the nutrition of the child, and thus cause threatening and even dangerous debility. In certain families, and in certain epidemic types of the disease, it assumes these severe features, and such cases must take the same rank in this disease that grave cases of scarlet fever, measles, or variola, take in those affections.

Cases of this latter kind imperatively demand treatment, and they are, we are happy to state, susceptible very generally of great and striking alleviation, by the use of proper means,—means, too, which in themselves are very safe.

At one time we were very much disposed, we confess, to avoid all interference so long as we saw no complication in the case, under the supposition that the disease in its simple form was always safe, and might be trusted to the efforts of nature. More enlarged experience has taught us, however, that the very violence of the disease, even in its simple form, was a source of danger; and that, moreover, such severe cases were much more liable than milder ones to complications, while a proper treatment, instituted so soon as the disease began to show these severe characters, has almost always, after a few days' perseverance, brought about and maintained a most evident amelioration of the symptoms, thus keeping within due bounds a development which might otherwise have gone on to a disastrous termination.

Bloodletting.—Depletion is very rarely necessary in simple pertussis. The only cases in which it can be called for are those occurring in sanguine children, where the laryngismus is so extreme and the paroxysms so violent as to lead to great engorgement of the right side of the heart, and even to endanger the brain by overdistension of the veins. Under these circumstances, we might resort to venesection merely for the mechanical relief afforded, as recommended under similar conditions in pneumonia. In such cases only then, a small bleeding, or the application of a few leeches to the temples or behind the ears, may be proper; but even these may generally be safely treated by reduced diet and by a few doses of saline cathartics, without a resort to the more powerful and more permanently exhausting means of depletion. As for the treatment of simple pertussis by repeated venesections, in the hope of curtailing its duration, or under the idea of their being rendered necessary by the violence of the malady, it seems to us forbidden by the present state of medical knowledge, which informs us that the greater number of the cases do not endanger life so long as they remain simple, however violent they appear to be. Of the 143 simple cases treated by ourselves, depletion was not used in any, and all recovered.

Narcotics and Antispasmodics.—Of the various remedies of this class which have been more or less extensively employed, the most important are belladonna, opium, and hydrocyanic acid. Assafœtida and, of recent years, several of the bromide salts have also been much used with apparent success.

Belladonna is highly recommended by several German authors, MM. Rilliet and Barthez, who state that it is beyond contradiction one most deserving of confidence, by Trousseau and Pidoux, and numerous English and American writers. MM. Trousseau and Pid employ the following formula:

℞.—Pulv. Belladonnæ, ...	gr. iv.
Extract. Opii Aquos., ...	gr. iv.
Extract. Valerianæ, ...	ʒss.

M. et div. in pil no. xvi.
S. One to four in the course of the day.

If the child dislike the pilular form, they give it in syrup, accord to the following formula:

℞.—Extract. Belladonnæ, ...	gr. iv.
Syrup. Opii,	
Syrup. Flor. Aurantii, āā	f℥j.—M.

Of this, from one to eight teaspoonfuls are to be given in twenty-four hours.

We have ourselves used belladonna in a very large number of ca of hooping-cough, and with such unquestionable benefit, that we gard it as one of the most valuable remedies for this disease in our p session.

We have certainly never seen it cut short the course of the disea as it has been asserted to do, but we have almost invariably found it moderate the laryngismus, shorten the paroxysms and diminish th number, and probably also shorten the duration of the attack. have not, however, been in the habit of prescribing such large doses belladonna as those quoted above (gr. $\frac{1}{4}$); but have usually given it combination with alum, in the dose of $\frac{1}{24}$th of a grain of the extra every four hours to a child of one year old. The formula which employ will be found in our remarks upon the use of alum.

Belladonna has also been largely used, especially by Dr. Fuller, combination with sulphate of zinc, and with excellent results. T latter author states that he has observed a remarkable tolerance belladonna in children, so that, beginning with quite large doses, amount may be rapidly, though carefully, increased until the quanti taken exceeds out of all proportion the corresponding doses which be tolerated by adults. Even when given, however, in the comparativ small doses of $\frac{1}{24}$th or $\frac{1}{12}$th of a grain, it is necessary to watch for a symptoms of the toxic action of the drug, so that its administrati may be suspended or the amount diminished.

Opium is confessedly a very valuable remedy in the disease, not a curative, but as a sedative and palliative. When the cough is frequ and fatiguing, especially if the patient have an irritable and nerv constitution, some opiate preparation is of the utmost service in m erating the frequency and violence of the paroxysms, and in allay irritability and restlessness. It is best given in the evening, and combination with ipecacuanha.

Hydrocyanic acid has been employed by various observers, and is highly spoken of by some. Its poisonous properties, however, have deterred many, and amongst them ourselves, from resorting to it. Inasmuch as there are other and safer means for conducting the disease to a favorable termination, it seems to us useless to venture upon so potent a preparation as this. Dr. Atlee, of Lancaster, gave it in the following formula:

℞.—Acid. Hydrocyan., ... ♏j.
Syrup. Simp., ... f℥j.—M.

A teaspoonful to be given morning and evening, and if no uneasiness, dizziness, or sickness be produced within forty-eight hours, the dose to be repeated three times a day. This prescription is for a child six months old; one drop of the acid being added for each year of the child's age beyond one year. He has never repeated the dose more than four times a day. (*Condie's Dis. of Child.*, 2d ed., p. 337.)

Since the discovery of the powerful antispasmodic properties of the various bromides, they have been much used in the treatment of this disease. The *bromide of ammonium* has been recommended, especially by Gibb and G. Harley, as a pharyngeal and laryngeal anæsthetic, to diminish the spasm of these parts, while, at the same time, the alkali acts by rendering the secretion from the bronchial mucous membrane more free and readily expectorated. The *bromide of potassium* acts in the same way, and is productive, probably, of equally good results. We have, also, used *assafœtida* in a number of instances with decided benefit, both in relieving the general restlessness and in moderating the number and severity of the paroxysms. The doses in which we have given it are either two or three grains in pill, or a teaspoonful of the mistura assafœtidæ, three or four times a day to a child of four years old.

Emetics and *Nauseants* are amongst the most important remedies in the treatment of hooping-cough, since they exert a powerful influence upon the disease, and unless carried to excess, are not in themselves likely to be injurious. Some authors recommend the administration of an emetic every day or every other day, while others give them according to the necessity of the case. Believing that frequently repeated emetic doses are unnecessarily severe, and productive of too much fatigue and exhaustion, we have preferred in the simple disease to give only small doses of ipecacuanha from time to time, so as to moderate the violence of the cough. Tartar emetic is never necessary, and ought to be avoided, on account of its disposition to irritate and inflame the gastro-intestinal mucous membrane, and because of its exhausting effects on the general economy. The syrup of ipecacuanha is the preparation we have almost always used. From ten to twenty drops, given three times a day to a child three years old, will very generally moderate the severity of the paroxysms.

Purgatives are necessary in the simple disease only when constipation is present. The mildest ought to be preferred, in order to avoid irritation and exhaustion. Castor oil, magnesia, or syrup of rhubarb ar the best.

Particular Remedies.—Of the different specific remedies that have bee employed, none have attained and maintained so high a reputation i this city as the *carbonate of potassa*, which, in the form of the cochinea mixture, is constantly used both by physicians and as a domestic remedy The beneficial effects of this drug are equally recognized abroad, a may be judged from the language of Niemeyer, who, when speaking o its use in hooping-cough (*op. cit.*, vol. i, p. 101), says, "Its effect in shortening the fits of coughing is often surprising." The following formul is the one generally administered:

℞.—	Potass. Carbonat.,	℈j.
	Coccii,	℈ss.
	Sacch. Alb.,	ʒj.
	Aquæ Fontis,	f℥iv.—M.

Give a dessertspoonful three times a day to a child a year old. Believing the carbonate of potash to be the active agent in the mixture, we have generally left out the cochineal and used the potash alone, dissolving it in equal parts of syrup of gum and water. We have frequently employed this remedy, and believe that it, with alum and belladonna, are the most useful agents we have to keep down the violence of the disease. We have given it in the dose of a grain three or four times in the twenty-four hours, to children one and two years old, for several weeks at a time, without witnessing any injurious effects from it.

Alum was first highly recommended as a remedy in pertussis by Dr. Golding Bird (*Guy's Hospital Reports*, April, 1845). He states that in the second or nervous period of the disease, when "all inflammatory symptoms have subsided, and when, with a cool skin and clean tongue, the little patient is harassed by a copious secretion from the bronchi, the attempt to get rid of which produces the exhausting and characteristic cough, alum will be found to be of much value." He adds, that he "has not yet met with any other remedy which has acted so satisfactorily, or afforded such marked and rapid relief." From reading Dr. Bird's remarks on alum, and prompted by our knowledge of its admirable qualities in the treatment of croup, we were formerly led to make trial of it in the disease under consideration, and we believe we may say that it has exerted a more decided influence in moderating the violence of the disorder, than any that we have ever made use of. We have administered it in 139 cases, beginning in the course of the second stage. In nearly all it was beneficial, and in some the effects were strikingly useful, the improvement being more rapid than we had ever seen to result from other remedies, or to occur when the disease has been allowed to pursue its natural course. In a boy, between five and six years of age, who had been coughing violently for two weeks, the paroxysms diminished so much in intensity and frequency, after he had taken the remedy two days, that he was not once disturbed at night (though before he had always been waked several times), and the spell ch occurred during the day were much less severe. After continu- the remedy for ten days, the disease had subsided so much that its loyment was suspended. Soon after, however, the paroxysms again ame severe and troublesome. The alum was resumed, and with the e results as at first. In another family in which there were three ldren, all of whom had been taking syrup of ipecacuanha and car- ate of potash for some days, without any good effects, the alum was en and acted as in the case first referred to. The nights were com- atively quiet, and the spells occurring through the day very much derated. We may repeat that, so far as our experience in the above cases goes, the effects of alum have been more decided and satis- tory than those of any other remedy. We have never known it to duce ill consequences, either at the time of its administration or sub- uently, though we have given it to children from two months to seven ars of age, and have continued its use from one to six weeks at a e. It, like all other remedies, sometimes fails, however, to do any d, and when we have found this to be the case, we have substituted lladonna or carbonate of potash, either alone or combined, and it is ious to observe how, in some instances, the latter remedies will suc- ed where the other fails. Nothing but a trial will show which is the st proper in any individual case. Of late years we have usually ven the alum and belladonna together, and have been much pleased ith the results. If administered in large doses, alum produces vomit- g. It does not constipate, but on the contrary, is apt to induce diar- œa, when continued for some time. Dr. Bird gives from two to six ains every four hours. His formula is as follows:

℞.—Aluminis,	gr. xxv.
Ext. Conii,	gr. xij.
Syrup. Rhœados,	fʒij.
Aquæ Anethi,	f℥iij.—M.

Give a medium-sized spoonful every three hours.

To children under one year, we give from half a grain to a grain, ree or four times a day; and to those over that age, two grains every ur or six hours. The formula we have employed is the following:

℞.—Aluminis,	℈ijss.
Syrup. Zingib., Syrup. Acaciæ, Aquæ Fontis, āā,	f℥j.—M.

hen this is prepared with good syrups, it tastes very much like lemon- e, and is not at all unpleasant, so that children take it without diffi- lty. The dose is a teaspoonful three times a day, or every four or hours.

As above said, however, we now generally employ a combination of m and belladonna, and have obtained better results from it than m any single remedy we have ever used. For a child one year old use the following formula:

℞.—Ext. Belladonnæ,	gr. j.
Aluminis,	ʒss.
Syr. Zingib., Syr. Acaciæ, Aquæ, āā,	f℥j.

M. et ft. sol.

Dose, a teaspoonful four times in the twenty-four hours: in the morning, at no bedtime, and once in the night, if the cough be troublesome.

Among other remedies which have been highly recommended, b which we have never found it necessary to resort to, may be mention the following:

Sulphur is much used by some German authorities, who greatly co mend its effects both at the beginning and throughout the course the disease. It may be given in powder diffused in milk or syrup, in emulsion, in doses of three grains, two or three times a day, to ch dren from two to four years of age.

Subcarbonate of Iron has been successfully employed by Dr. Steyma and by Lombard, of Geneva.

Dilute Nitric Acid, first recommended by Arnoldi, of Montreal, h been highly praised, especially by Gibb.

Conium has also been frequently used, both alone and as an ingredie in formulæ containing some of the other remedies here mentioned, a appears to alleviate the violence of the paroxysms, though to a le marked degree, we believe, than belladonna.

Inhalations.—It was noticed in France, some years ago, that childr suffering with hooping-cough, who lived in the neighborhood of ga works, were rapidly cured; and the plan has been recently tried wi success, of sending patients with this disease to inhale the fumes ar ing during the purification of gas, which contain ammonia, vapor tar, and several volatile oils. Dr. Bertolles (*British Med. Jour.*, Nov. 1864) states that "the register of the gas-works at Ternes, shows th during the previous six months, 901 patients have been subjected the vapor treatment, of whom 219 were cured and 122 relieved." Commerege (*id. loc.*) has also reported the effects observed in 142 ch dren who were brought under the action of the gases in the gas-wor at St. Maudé; and believes that the treatment produces excelle results at all stages of the disorder. In general, twelve séances, ea of which should be of two hours' duration, are required for the cu We have ourselves known of quite a number of instances among t children of the poorer classes in this city, where patients, sufferi with hooping-cough, have been allowed to inhale the fumes from t gas-works, and have experienced positive benefit.

Tonics.—In a number of cases that have come under our notice, t patient has grown pale and weak in the course of the disease, and t without any local complication, but from the disturbance of the dig tive system that often exists to a greater or less extent, from the gre frequency of the vomiting, which prevents them from taking a su cient amount of nutriment, and from the exhausting effect of the vi lent muscular exertion undergone during the paroxysms. In su instances, when there has been no fever, or merely a little eveni ricula, we have employed tonics with much advantage, and never to e injury of the patient. We have generally made use of Huxham's cture of bark, either alone, in doses of from ten to twenty drops ree times a day, or in connection with the syrup of the iodide of n, or half a grain of the metallic iron (Pulv. Ferri). When the ap- tite has been very feeble, we have found that quinine, in the dose of grain three or four times a day, at the age of three or four years, has stored it more rapidly than any other remedy we have used.

Local Applications.—*Revulsives.*—The milder revulsives are useful certain complications of pertussis, and as palliatives. To make them e chief basis of the treatment, however, which has been done by some, a mistake. In order to produce a decided impression upon the dis- ase, it would be necessary to resort to the more powerful remedies of his class, such as moxas, issues, tartar emetic ointment, blisters, &c., he use of which is not warranted by the nature of the disorder.

When the laryngismus has been severe, we have known the use of a belladonna plaster, 2 by 3 inches, applied over the larynx and worn for several days, to afford relief.

Topical applications to the interior of the larynx of solutions of nitrate of silver have been used by several practitioners, as by Gibb and Eben Watson, and apparently with much benefit. The strength of the solution should vary according to the stage of the disease, being much reduced during the early acute period.

Before concluding our remarks upon the treatment of simple hooping-cough, we wish to state that cases of the disease occur not unfrequently of so mild a form, as to need absolutely no treatment other than the proper degree of attention to hygiene; and that others again, more numerous than those just mentioned, will be met with, in which the only treatment necessary is the use, for a few days or weeks, of some mild expectorant and opiate at night to lessen the severity of the paroxysms, or of moderate doses of alum, belladonna, or carbonate of potash.

In infants particularly it is proper to give as little medicine as possible, allowing the disease to go on without interference so long as it progresses safely. In a good many mild cases, small doses of paregoric and syrup of ipecacuanha, constitute the only remedies we have found necessary in the cases of infants. When, however, the paroxysms become numerous and violent, exhausting the strength of the child and distressing its nervous system, we must make use of some remedy to allay the severity of the attacks. We have found the alum and belladonna formula recommended above safe and effectual. At the age of two and three months, we have usually given from half a grain to a grain of the former, combined with $\frac{1}{24}$th grain of extract of belladonna, three times a day, taking care to suspend it for a day or two if it caused troublesome vomiting or purging, and then resuming it in diminished dose. Or we have made use of a quarter or half a grain of carbonate of potash, also combined with the twenty-fourth part of a grain of the extract of belladonna, three or four times a day.

Treatment of the Complications.—If any of the diseases whic have been mentioned as apt to occur during the course of pertussi should arise, the treatment which is proper for them in their idiopathi form must be adopted without regard to the hooping-cough, with th following reservation: that care must be taken not to use means of to powerful and exhausting a nature, or such as have a tendency to irritate the organ with which they come in contact. For, it must be recollected, that after the complication is cured, the patient has still the original disease to go through with, and therefore requires all his strength; and, moreover, the various organs of the body are predisposed, by the very fact of the existence of the original malady, to assume diseased action, should any irritation in the shape of a violent remedy be applied to them.

The cases of *bronchitis* which came under our observation were treated in the simplest manner. The children were put to bed, the diet car fully regulated, the bowels gently opened with castor-oil or syrup of rhubarb, and small doses of syrup of ipecacuanha or antimonial wine, with sweet spirit of nitre, were administered every two hours. Mustard poultices were applied once or twice a day to the interscapular space, and mustard foot-baths used every night, or more frequently, i the dyspnœa were considerable. If the bronchial secretions were very profuse, and the cough troublesome, the decoction or syrup of senek was given in connection with occasional doses of laudanum or paregori

The treatment of *collapse of the lung* should be that which is recommended in the article on that subject, modified, of course, as may b rendered necessary, by the existence of the hooping-cough. A mil emetic, if the patient seem strong enough to bear one; counter-irr tants, and especially sinapisms or mustard poultices applied to th chest, nutritious food, and mild stimulants, as brandy, wine-whey, tin ture of bark, quinine, or aromatic spirit of ammonia, must form th principal means of treatment.

The complication of *pneumonia* should be treated somewhat diffe ently. At the present time we should advise the use either of th combination of sulphurated antimony and Dover's powder, or of one o the alkaline mixtures, recommended in the article on pneumonia, i conjunction with external applications and the use of the foot-bath and should not resort to bleeding, whether local or general, unless th indications, elsewhere laid down as calling for depletion in pneumoni should be present in a marked degree.

When *convulsions* occur they must be treated according to the caus which produces them, and the constitution and present state of th child. If the patient be strong and sanguine, and not exhausted b previous sickness, the treatment should consist of depletion by leeche to the temples, or behind the ears; of cold applications to the head the warm bath; cathartics or purgative enemata; and revulsives i the form of sinapisms, or of a small blister to the nucha. If, on th contrary, the patient is of delicate constitution, or exhausted by lon illness, and especially when the convulsions are the result of extensi llapse of the lungs, occurring spontaneously or supervening upon onchitis, we must be content to resort to warm baths, revulsives, tispasmodics, and anodynes, stimuli, and stimulating enemata.

Of the 12 cases of convulsions that came under our notice, 5 proved tal. Two of the fatal cases occurred in children who had long been boring under bronchitis, probably associated with collapse, that had affled all treatment. Death took place within twenty-four hours om the appearance of the convulsions, which were in fact the result f the diseased condition of the lungs. No treatment further than the arm bath and sinapisms, was resorted to. In the third case, the conulsions came on in the seventh week of the disease, in a child who ad been laboring for a number of days under severe bronchitis; they nded fatally in seven hours. The treatment employed at the beginning of the fit was a warm bath, an enema, and mustard plasters. After a few hours, solution of morphia with fluid extract of valerian were given by enema, cold was applied to the head, and a blister to the nucha. In the fourth case, which occurred in a child in the second year of its life, they were caused by bronchitis and collapse, and proved fatal in two days. The treatment consisted in the use of warm baths, counter-irritants, alum, and small doses of brandy. The fifth case likewise occurred in the second year. This was one in which all the symptoms of laryngismus stridulus—prolonged laryngismus, contracture, and general convulsions—were added to those of the primary disease. It was treated with belladonna, opium, assafœtida, and warm baths, but all to no effect.

Of the favorable cases, one occurred in a boy five months of age, on the third day of a severe attack of bronchitis. The child was immediately placed in a warm bath, and large sinapisms applied over the front of the chest and upon the extremities, when the convulsions ceased. After this he was treated with half-grain doses of alum, repeated every three or four hours, mustard foot-baths, and poultices, and small doses of wine of opium. On the sixth day of the attack, the third after the convulsive seizure, there having been no return of the convulsions, the bronchitis subsided with copious sweats and cold hands and feet, for which small quantities of brandy and water and wine-whey were used. The recovery was perfect. A second case occurred in a hearty boy nine months old, and seemed to depend on congestion of the brain, brought on by a severe fit of coughing. In this instance a venesection to a small amount was performed, the child was placed in a warm bath, and cold applied to the head. No return of the spasms took place, and the child recovered without difficulty. In another case the convulsion was caused by an attack of fever depending on dentition, and was treated by lancing the gums, by a warm foot-bath, and by the administration of a grain of calomel in a teaspoonful of castor-oil. In the fourth case the convulsions were caused by pneumonia, and were managed by treating the pneumonia, except that at the moment of the attack a warm bath and a stimulating enema were made use of. In a fifth the convulsion, which was a short one, occurred at the onset of an attack of bronchitis. No particular treatment beyond what was necessary for that disease was required. In a sixth, in a boy nine months old, the convulsion occurred suddenly, was violent, and lasted fifteen minutes. The cause could not be ascertained. The only treatment used for the convulsion was a warm bath. There was no return. In a seventh case, in a boy nine months old, a slight convulsion occurred during one of the paroxysms in the fifth week. No treatment was necessary, as the attack was very short, and there was no recurrence of the symptoms.

Hygienic Treatment.—This part of the management of the disease is of the highest importance, for it is by careful attention to its details that the complications which constitute the chief danger of the malady are to be prevented. In a considerable number of cases of pertussis, nothing more need be done than to insist upon strict attention to hygienic rules. The chief indications are, to preserve the child from taking cold, and to prevent indiscretions in diet. The clothing ought to be warm, and during the autumn, winter, and spring, flannel should always be placed next to the skin. The child ought to be kept in the house during damp weather at all seasons, and whenever, during the winter season, it is intensely cold. The diet should be nutritious, but of easy digestion. All heavy, rich food ought to be absolutely forbidden during the continuance of the malady.

Treatment of the Paroxysm.—It often happens that the paroxysms are so violent that the child seems to be in imminent danger of suffocation or of convulsions. This is especially true of infants. In six cases that we have seen, in infants under six months old, the kinks lasted so long, and the spasm of the larynx was so unyielding, that the children struggled as though laboring under tetanus; the countenance was disturbed and anxious; the face and hands, at first flushed, became purple from deep congestion; and on some occasions the breathing was suspended for several seconds, so that life *seemed* for the time in the greatest danger. The difficulty in these cases depends on the spasmodic closure of the glottis, which is sometimes, no doubt, completely shut. We have never known these alarming symptoms of asphyxia to occur when the hoop has been clear and distinct, for when that is present, the larynx cannot be very tightly closed.

When the symptoms above described occur in a child several years of age, the patient should be raised and supported in the sitting posture; when in an infant, the child ought to be held lightly in the arms, so that it may take any position which instinct prompts it to. At the same time, cold water ought to be sprinkled from the fingers upon the face, the child should be gently fanned, or, if the weather be warm, taken to the open window; and if there be time, it is well to put the feet into mustard-water. It has been recommended on such occasions to apply compresses dipped into cold water to the sternum. We would propose the trial of a means which the late Dr. C. D. Meigs found very successful in arresting tonic spasm of the respiratory muscles, in a case of laryngismus stridulus. This is the sudden application of a piece of ıpped in linen to the epigastrium. When the laryngeal spasm · intense and obstinate, a belladonna plaster, as before recomd, or a small blister to the front of the neck, may be useful in lling it.

ell speaks very highly of the results obtained by sprinkling a ther on the clothes of the patient at the onset of the paroxysm; r. Churchill (*Diseases of Childhood*, p. 223), who has tried ether ır 14 cases, and chloroform in 6, regards it as a valuable addition remedies. He directs that about half a drachm of sulphuric hould be spilled on the nurse's hand and held before the child's nd mouth at the commencement of a fit of coughing. In only two cases no benefit accrued, while in others great mitigation spasm, and in three or four almost complete relief followed when her was thus applied. We should certainly recommend a trial procedure, making use, however, from preference, exclusively sulphuric ether.

CLASS II.

DISEASES OF THE CIRCULATORY ORGANS.

ARTICLE I.

CYANOSIS.

Synonyms.—Definition.—This peculiar condition, known under the various names of Morbus Cœruleus, or the blue disease, and Cyanosis, may be defined as a permanent state of lividity or blueness of the skin, depending upon numerous malformations or derangements of the heart and great vessels.

In a comparatively slight degree, this condition attends many of the chronic organic diseases of the circulatory organs; and is also transiently present in the course of some acute diseases; but under neither of these circumstances does the lividity merit consideration as a separate affection, being merely due to the imperfect oxygenation of the blood.

There is, however, one form of cyanosis which we have occasionally met with that merits a special reference. In these cases, the blueness of surface has appeared from three or four days to as many weeks after birth, has been intense in its degree, and associated with marked disturbance of respiration, and yet, under proper treatment, the infants have usually recovered. We believe that the cause of such cyanosis is to be found in atelectasis of the lungs, which acts partly by causing general venous congestion, and partly perhaps by obstructing the flow of blood through the pulmonary artery, so that the right cavities of the heart become over-distended, and there results an admixture of venous and arterial blood through the still unclosed foramen ovale.

Before attempting to explain the peculiar blue color in cases of true cyanosis, it will be convenient to allude to the various lesions which have been found present in such cases.

Morbid Anatomy.—The blood in cyanosis is dark, and contains an excess of carbonic acid; it has also lost, to a great extent, its coagulability. The only organs beside those of circulation which present lesions, with any constancy, are the lungs.

Dr. J. Lewis Smith (*Dis. of Infancy and Childhood*, 1869, pp. 578-599), who has studied this disease with great care, and collected all the cases of it upon record, finds the condition of the lungs recorded with more or less minuteness in 110 out of 191 cases. In 26 cases there was

rculosis, either confined to the lungs, or chiefly exhibited in these
ns; in 35 cases the lungs were of small size, either from compres-
by effusion in the pleural sacs or pericardium, or sometimes, appar-
y, from the persistence of the fœtal state over a greater or less
ion of the organ. In 35 cases the lungs presented a dark color,
ng either to atelectasis or to engorgement and congestion. In 9
e was emphysema in a part of the lungs; in 2, pneumonia; in 2,
color was pale; in 1, a bright crimson; in 1, the lungs were larger
n natural; in 1, the right lung was absent; and in 17, these organs
e recorded as healthy.

here is also found, in a large proportion of cases, venous conges-
of the brain, liver, or kidneys. By far the most marked and im-
tant lesions, however, are those of the heart and great vessels,
ich are, excepting in extremely rare instances, the essential seat of
disease. The number of these lesions already recorded is consider-
e, as will be seen from the subjoined table borrowed from Smith,
ich shows their character and relative frequency.

1. Pulmonary artery absent, rudimentary, impervious, or partially obstructed,	97
2. Right auriculo-ventricular orifice impervious or contracted,	5
3. Orifice of the pulmonary artery and the right auriculo-ventricular aperture impervious or contracted,	6
4. Right ventricle divided into two cavities by a supernumerary septum,	11
5. One auricle and one ventricle,	12
6. Two auricles and one ventricle,	4
7. A single auriculo-ventricular opening; interauricular and interventricular septa incomplete,	1
8. Mitral orifice closed or contracted,	3
9. Aorta absent, rudimentary, impervious, or partially obstructed,	3
10. Aortic and the left auriculo-ventricular orifices impervious or contracted,	1
11. Aorta and pulmonary artery transposed,	14
12. The cavæ entering the left auricle,	1
13. Pulmonary veins opening into the right auricle, or into the cavæ or azygos veins,	2
14. Aorta impervious or contracted above its point of union with the ductus arteriosus; pulmonary artery wholly or in part supplying blood to the descending aorta through the ductus arteriosus,	2
	162

It is evident from a glance at this table, that the vast majority of the
bove lesions must occur before the full development of the heart is
ttained; and that consequently, in nearly every instance, cyanosis is a
ongenital affection. But further than this it will be observed, that in
he first four groups in Smith's table, or in 119 out of 162 cases, the
sions affect the right side of the heart, and are precisely of the kind
hat we know are caused by inflammation of the endocardium. Bear-
ng in mind then the well-ascertained law, that endocarditis occurring

during fœtal life, almost exclusively attacks the right side of the we can readily understand how such lesions could be produced attack of inflammation affecting either the valves of the pulm artery, or the tricuspid valves, or some part of the lining membr the right ventricle. Should such an attack of endocarditis occur the development of the cavities and septa of the heart, and the cl of the foramen ovale and ductus arteriosus, and lead to occlusion orifice of the pulmonary artery, it would of course be impossibl life to be sustained. But where such a lesion is produced, whil interauricular and interventricular septa are still imperfect, an ductus arteriosus patulous, so much compensation may be affected life can often be prolonged for many years. Thus, it is evident the first effect of the closure of the orifice of the pulmonary arte such an early period, will be to cause a large portion of the blood the right ventricle to pass directly through the opening remaini the interventricular septum into the left ventricle. Usually this op is not free enough to relieve the right ventricle entirely, and th consequently pressure exerted backwards on the blood entering the right auricle, which forces part of it through the foramen into the left auricle, and thus still further relieves the fulness o right cavities. As there is no outward current through the pulm artery, owing to the occlusion of its orifice, blood flows back int vessel from the aorta through the patulous ductus arteriosus, and supplies the lungs. At the same time the bronchial arteries be much enlarged, and, in some rare cases, blood has been able to the lungs through abnormal branches from the internal mamma intercostal arteries. In cases of cyanosis which prove fatal very after birth, the most diverse and inexplicable lesions, as before en ated, may be found; but in those instances where life is prolonge heart is usually found to present the associated lesions above desc contraction or occlusion of the orifice of the pulmonary artery, i fect interventricular septum, and patulous foramen ovale and d arteriosus. In such cases, when the compensatory communicatio tween the right and left side of the circulation are free, life may b longed for many years.

This was very nearly the condition found in the following case opportunity of examining and describing which we owe to the cou of Dr. C. H. Thomas.

"The patient was a young man, æt. 22 years, who had been markedly cy from infancy, and was poorly developed. He was unable to maintain a prope perature. He suffered constantly from slight dyspnœa, with occasional exacerb At the autopsy there was marked congestion of the abdominal viscera, and th bladder was packed with galistones. Both lungs contained numerous yellow n tubercles.

"The heart was rounded. The cavities of the ventricles were not much enl nor was there any hypertrophy of the walls of the left ventricle. The walls

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[1] See Descriptive Catalogue of Path. Museum of Penna. Hosp., No. 1501, p. William Pepper, M.D. 1869.

t ventricle were, however, decidedly thickened, though not equalling those of left. The septum ventriculorum was disproportionately thick, and terminated at one-third of an inch below the level of the origin of the aorta in a smooth, nded edge, over which the endocardium was thickened. The septum also seemed ide of its normal position, so as almost to bisect the aortic orifice. The aorta, which slightly dilated but quite healthy, thus communicated freely with both ventri-s. The origin of the pulmonary artery was very much obstructed, owing to coa-cence and contraction of its valves. The ductus arteriosus was, unfortunately, not served, but, owing to the large size of the pulmonary artery beyond the seat of struction, it had in all probability remained patulous. The foramen ovale was sed."

In this instance, the orifice of the pulmonary artery not being en-rely closed, the opening in the interventricular septum had been large ough to allow the right ventricle to relieve itself in that way, and nsequently the foramen ovale had closed.

When writing of atelectasis pulmonum (p. 142) we called attention the fact that in some cases, where the state of imperfect expansion rsisted, the continued obstruction to the pulmonary circulation was llowed by the same train of lesions, viz., patulous ductus arteriosus and ramen ovale, and dilated hypertrophy of the right side of the heart, as re consequent upon obstruction of the orifice of the pulmonary artery, nd which, as in the latter case, might be attended with cyanosis.

The mere persistence of the foramen ovale can scarcely be regarded a cause of permanent cyanosis. It is quite possible that during the arly days of extra-uterine life, a certain amount of cyanosis might xist owing to the admixture of venous and arterial blood allowed by this opening, but after the forces of the circulation become equalized, it is quite certain that the valve of the foramen may remain unattached, or may even be somewhat insufficient to close the opening, and yet no cyanosis be present.

As an illustrative case of one of the rarer forms of cyanosis, and one which bears in the most interesting manner upon the theory of its production, we abstract the following from a more full account published in the *Proceedings of the Pathological Society of Philadelphia*.[1]

The child was a well-developed male, born at full term. No discoloration was noticed at birth, but on the twelfth day, as the grandmother was preparing to wash it, it had a convulsion, and from that time presented coldness of the extremities, gradually increasing lividity, feeble and rapid pulse, and moaning and sighing respiration.

During inspiration, the sternum and upper parts of the chest were elevated, but the lateral regions remained unexpanded, and there was marked recession of the base of the thorax. The percussion-resonance was diminished on both sides, but especially on the right. The vesicular murmur was puerile, except over the right side, where it was feeble. The cardiac sounds were decidedly louder at the right scapula than over the left. The cardiac impulse at the left nipple was very indistinct, and the sounds there feeble but natural. On pressing two fingers lightly to the left of the ensiform cartilage, close to the costal cartilages, a very distinct and quite vigorous impulse could be felt, one much more distinct than at the nipple. At this point, a distinct blowing sound attended the systole of the heart. The diagnosis made at the time was: atelectasis of both lungs, of the right greater than of the left; dilatation with hypertrophy of the right ventricle; obstruction of the pulmonary artery, and open foramen ovale. Death occurred on the forty-fourth day after birth.

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[1] Transposition of the Arteries. Dr. J. F. Meigs. Proc. of Path. Soc., vol. ii, p. 87; and Am. Jour. of Med. Sciences, vol. xi, 1860, p. 415.

At the autopsy, the body was very small and thin. The thorax was flattened laterally, and contracted at the base. There was marked collapse of the lower lobes of both lungs, and especially of the right. The heart was one-half too large, and full, rounded, and distended with soft black clots. The walls of the right ventricle were very thick, and its cavity quite small; it presented the appearance we usually associate with the left ventricle. The walls of the left ventricle were thinner than those of the right; and its cavity was much more capacious than that of the right. The right auricle was dilated and considerably larger than the left. The foramen ovale presented an opening at its lower aspect of about 2 or 3 lines in diameter. The orifices of the venæ cavæ appeared smaller than usual.

The aorta and pulmonary artery were transposed. The aorta arose from the right ventricle in the usual position of the pulmonary artery; the pulmonary artery arose from the left ventricle, and passing under the arch of the aorta, gave to the latter, just beyond the left subclavian, the ductus arteriosus, which was quite pervious and of considerable size. The valves of the heart were healthy and not transposed. The pulmonary artery was of the natural size; and presented no obstruction at its point of origin. After giving off to the aorta the ductus arteriosus, it divided as usual into two pulmonary branches, which soon subdivided into others.

The aorta was of full size and presented nothing unusual. It gave off at its arch the innominate artery, and then the left primitive carotid and the left subclavian. Just beyond the latter it received, from the pulmonary artery, the ductus arteriosus.

The pericardium was normal in all respects.

Theories as to the Production of Cyanosis.—In the vast majority of cases the malformation which causes cyanosis is of such a character as to allow admixture of the venous and arterial blood, and, at the same time, to interfere more or less with the circulation of this mixed fluid. Ever since the time of Morgagni, authors upon this subject have been divided in opinion as to whether the coloration of the skin were due exclusively to one or the other of these causes: obstruction to the cardiac circulation and consequent venous congestion, or intermingling of the venous and arterial blood.

In regard to the first of these causes, although it has numbered among its advocates Morgagni, Louis, and Stillé, it cannot be considered competent to fully explain all the cases and peculiarities of cyanosis, although such central obstruction will unquestionably aid in its production.

Nor can the second theory be held exclusively sufficient, since not only are there cases met with where cyanosis is present and yet no admixture of venous and arterial blood is possible, but also, on the other hand, where a considerable degree of admixture exists without the production of cyanosis.

It seems necessary, therefore, as Smith has clearly pointed out, that any theory which pretends to embrace all the elements of this complex condition, should embody a reference to the fact that the essential defect in cyanosis is a want of arterialization of the blood.

SYMPTOMS.—Even in cases where cyanosis is due to congenital or-nic lesions, the peculiar symptoms are not always present until some me after birth.

Thus, in 138 of the cases of cyanosis collected by Smith, the time at hich lividity was first noticed is stated as follows:

In 97 it was within the first week, and often within a few hours after birth.

In 3 at 2 weeks.
" 1 " 3 "
" 2 " 1 month.
" 7 from 1 to 2 months.
" 5 " 2 " 6 "
" 5 " 6 " 12 "
" 3 " 1 " 2 years.

In 6 from 2 to 5 years.
" 1 " 5 " 10 "
" 6 " 10 " 20 "
" 1 " 20 " 40 "
" 1 over 40 years.
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41

Dr. Smith adds, "that in these 41 cases, in which blueness did not occur till after the age of one week, if the patient were less than two years old when it commenced, there was frequently no obvious exciting cause; but above this age, with three exceptions, such a cause is known to have been present. It is interesting to observe how trivial the exciting cause frequently is" (an acute attack of sickness, an attack of convulsions, difficult parturition, a fall, or even a severe blow), "and equally interesting to note how long patients have enjoyed good health, not having the least lividity, although the anatomical vice, to which the final development of cyanosis was due, had existed from birth."

The most characteristic symptom of cyanosis is the lividity of the surface, which varies in different cases from mere duskiness to a deep purplish tint. This color also varies in degree in different parts of the body, being most marked in the distant and especially the dependent portions, upon the mucous membranes, and wherever the capillary vessels are abundant, as on the face. Its degree varies, finally, in the same case with the condition of the circulation. In slight cases, when the patient is quiet and the circulation tranquil, the discoloration of the surface may be imperceptible, but upon any exertion, and especially in the more severe cases, the lividity becomes much intensified. In some instances, such as that narrated by us below, there may be actual ecchymoses of the surface, as in purpura.

The state of the general nutrition is much impaired, and the subjects of this disease are usually stunted and illy developed. In many instances the generative system appears even more imperfectly developed than the rest of the economy. The temperature of the body is always reduced, and exposure to cold is very poorly borne.

In a good many cases the thorax presents the deformity so often found in association with rickets, known as the "pigeon-breast." It usually happens, also, that the ends of the fingers and toes become bulbous. Disturbances of the circulation and respiration are of frequent occurrence. Thus there is often some abnormal bruit heard in the cardiac region, due to the abnormal condition of the heart. The pulse may be regular and of fair volume, but more frequently is small, irregular, or intermittent, and palpitation is very readily induced by exer The disturbance of respiration usually corresponds in degree witl embarrassment of the circulation.

While the patient remains quiet his breathing may be easy and r lar, but usually any sudden movement or exertion or emotion is s cient to induce a paroxysm of dyspnœa, during which the lividit surface becomes much deeper. In infants these paroxysms not ra terminate in convulsions. Headache is frequently complained of, is very apt to be caused by whatever disorders the circulation. Du the paroxysms of palpitation, pain is often complained of in the re of the heart, but is rarely persistent.

Owing to the extreme venous stasis frequently present, there tendency to passive hemorrhages in cyanosis, which expresses itsel bleeding from the nose, mouth, stomach, or rectum, or under the s Œdema of the lower extremities is often met with as a temporary dition after long standing on the feet; it is also apt to appear and invade the rest of the body towards the close of the case, when the culation becomes more enfeebled.

MODES OF DEATH.—Many cyanotic patients die from the effec some intercurrent acute disease, as hooping-cough or one of the ex themata, all of which are very badly borne in this condition.

The theory that venous congestion is opposed to the developmen tuberculosis, was applied by Rokitansky to this affection; but with any sufficient ground, since, as we have seen already, tuberculosis found as the cause of death in no less than 26 of the cases collected Dr. Smith.

In other cases death occurs suddenly, either during an attack of c vulsions or a paroxysm of dyspnœa.

In severe cases of cyanosis life is rarely prolonged more than a years; but in less marked cases the patients may even attain mid age. In 186 cases collected by Dr. Smith, the age at death was as lows:

In 17 under age of 1 week.
" 10 from 1 week to 1 month.
" 12 " 1 month to 3 months.
" 11 " 3 months to 6 "
" 17 " 6 " " 12 "
" 12 " 1 year to 2 years.
" 21 " 2 years to 5 "
In 21 from 5 years to 10 years.
" 41 " 10 " " 20 "
" 20 " 20 " " 40 "
" 4 over 40 years.
—
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So that in 67, or more than one-third, death occurred before close of the first year; in 121, or more than three-fifths, before the of 10 years; only 24 survived the age of 20 years, and 4 the age o years.

We subjoin the history of a case of cyanosis which we had under servation for several years, in which the symptoms of this peculiar dition were extremely well marked.

The above note was taken in December, 1869. Since our last edition, this case has terminated fatally, and a post-mortem examination proved the existence of marked congenital malformation of the heart, of the character already fully described, originating evidently in obstruction of the pulmonary orifice.

J. W., æt. 16 years and 7 months, has been cyanotic since infancy, but for the past few years, at least, has enjoyed fair health. At present there is marked lividity of the lips and of the nose, especially at the extremity, which seems somewhat increased in size. His hands habitually appear as though stained with solution of carmine, the skin being uniformly livid over the whole hands, but becoming lighter colored on the forearms. Pressure partly removes the lividity, which returns slowly after the withdrawal of the pressure. At times there have been little ecchymoses of the surface, followed by the effusion of serum under the epidermis, and the formation of superficial excoriations, which have left small cicatrices. Only a few of these have appeared on the hands.

These vascular disturbances are even more marked in the lower extremities. The feet are continually deeply livid; and over their surface and the ankles, very numerous ecchymotic spots have appeared, which underwent the same changes as those on the hands, and have left shining cicatricial spots, of a deep blackish-red color from the deposit of pigment, and surrounded by a dark brownish stain. There has also been a good deal of œdema of the feet lately. All of these conditions have been improved by the use of tight-laced stockings. The skin of both the hands and feet is rather soft and moist. The last phalanges, both of the fingers and toes, are markedly clavate and hypertrophied. Firm pressure upon them reduces their size; but, upon withdrawal of the pressure, the blood slowly returns, and they regain their former size. The temperature of the body is always low, and he suffers extremely from exposure to cold.

He suffers somewhat from dyspnœa, even upon slight exertion, but less so than formerly. He is also troubled with cough during the winter months. There is marked deformity of the thorax, the first and second pieces of the sternum uniting at an obtuse angle, and the cartilages of the third, fourth, fifth, and sixth ribs, forming a marked prominence on either side of the sternum; the ensiform cartilage is considerably depressed.

The apex-beat of the heart is in the fifth costal interspace, and just inside of the vertical line of the nipple. The heart's action is regular, and at present there is no abnormal cardiac murmur, though two years ago there was a distinct soft systolic bruit. The pulse in the standing posture is 114, in the sitting, 108. He has occasional attacks of epistaxis, and suffers quite frequently from attacks of gastric disturbance attended with severe headache.

Treatment.—In the form of cyanosis which we have described as depending on collapse of the lungs, the child should be placed in the position below recommended as rendering the heart's action most free; the temperature of the body should be carefully maintained, and a few doses of brandy in water or breast-milk should be given at intervals. There is evidently but little good that can be done by mere medication in cyanosis depending on malformations of the heart. When the heart's action is feeble and irregular, digitalis, iron, and quinia, may be administered. During the paroxysms of palpitation and dyspnœa, the best remedies are diffusible stimulants, such as Hoffman's anodyne, spirit of chloroform, ammonia, and brandy; and derivatives, such as sinapisms to the chest or hot mustard foot-baths. In cases where the digestion is markedly feeble, the use of vegetable tonics is indicated.

By far the most important part of the treatment, however, is attention to the hygienic conditions of the patient. He should as may be practicable, avoid all excitement and active exerti diet should be digestible and nutritious, his clothing should be and, in addition, he should carefully avoid all exposure to sever

In cases where the venous congestion of the legs is marked tended with œdema or with enlargement of the veins, laced st should be worn.

It occasionally happens that cyanotic patients find that certai tions afford them peculiar ease and comfort. Believing that i where the lividity appeared soon after birth (cyanosis neonator was due to a patulous condition of the foramen ovale, the la Charles D. Meigs was led to recommend (*Diseases of Children*, 1 92), that such children should be placed upon a pillow, on th side, the head and trunk being inclined upwards about 30° The object of this position was "to bring the septum of the s into a horizontal position, so that the blood in the left auricle press the valve of Botalli down upon the foramen ovale."

In a certain number of cases the adoption of this recommen has undoubtedly seemed to relieve the lividity, so that it is p desirable that all cyanotic infants should be placed in this po though from a glance at the anomalies in the formation of the which frequently attend cyanosis, it is evident that in most c could furnish no material relief. We are ourselves inclined to at the relief afforded by this position, not to any influence upon th men ovale, but to the fact that the heart's action is far most fr unincumbered when the child is placed upon the right side, w trunk somewhat elevated.

ARTICLE II.

DISEASES OF THE HEART.

As we are prevented, by the limits of this work, from giving tailed account of many of the affections which merely occur i hood in common with adult life, we propose in this article to off a few practical remarks upon the differences presented by dis the heart occurring at these two periods of life.

Apart from those congenital malformations of the heart, alre cussed in the preceding article, the diseases of this organ most fre met with in childhood, are pericarditis, and acute and chronic e ditis, with valvular disease.

The most frequent causes of these affections are rheumatism, culiar alterations of the blood present in scarlatina, rubeola, an theria, and extension of inflammation from the adjacent tissues, i f pleurisy or pneumonia. Of these well-recognized causes, rheuma- sm is by far the most frequent; for, although young children are com- aratively rarely the subjects of this disease, it is followed by some ardiac complication in a larger proportion of cases in childhood than n after years. This fact will be more fully referred to in our remarks pon rheumatism, where we dwell upon the importance of recognizing his marked tendency, and of watching most critically for the appearance of any symptom indicating that the heart has become involved. This extreme watchfulness is the more necessary, because it frequently happens in young children, that for several days before the development of any local articular trouble, there may exist marked rheumatic fever, with serious inflammation of the membranes of the heart.

In a few instances an acute cardiac affection cannot be traced to any of the causes above-mentioned, but appears to occur idiopathically, without exposure to any recognizable exciting cause.

So, too, in some cases of chronic valvular disease, and especially, it has seemed to us, of contraction and thickening of the mitral valve, the lesion cannot even be traced to any acute attack of endocarditis, but seems more akin to a fibroid degeneration, whose cause and early symptoms have been obscure and entirely overlooked.

Possibly, in some of these interesting cases, the real starting-point of the disease may have been an attack of endocarditis in fœtal life, which partially spoiled the valve, and set on foot degenerative changes, which slowly increased until they produced fatal symptoms.

Acute Pericarditis may occur at any period after birth. In very young infants it has been observed in conjunction with peritonitis, and was apparently due to erysipelas; while in other cases no cause could be assigned for its occurrence. The symptoms are, however, so vague and difficult to appreciate at this tender age, that the lesion is rarely recognized until after death. The infant is evidently in pain; the features are pinched and shrunken, the skin hot at first, and the pulse and respiration greatly accelerated. The physical signs can, however, rarely be satisfactorily determined, partly because death usually occurs before the lesions reach any considerable degree of development.

In older children the physical signs are often obscured by the coexistence of some inflammatory condition of the lungs or pleura, and the existence of pericarditis can only be surmised by the presence of a degree of disturbance of the circulation and respiration out of all proportion to the amount of lung trouble.

When, however, pericarditis occurs without any such complication, it may be often recognized by the seat of pain; the existence of great dyspnœa, amounting at times to orthopnœa; the great frequency of the pulse, which is often small, and even irregular; the disturbance of circulation, as shown by lividity of the lips and face; and, finally, by aus- ltation and percussion, which reveal at first merely a friction-sound, d later, when effusion has occurred, distant and feeble heart-sounds, th an increased area of cardiac dulness.

When severe, pericarditis in children usually proves fatal. After death the same anatomical lesions are found as after pericarditis in adult life. The membrane is, in the first stage, reddened, injected, dryish, and slightly roughened; while later it is still injected and even ecchymosed, thickened, softened, and covered with patches or uniform layers of whitish or yellowish-white lymph, the surfaces of which are usually flocculent or irregularly roughened. The pericardial sac contains a variable quantity of turbid, or, at times, bloody serum; or, in secondary cases, a sero-purulent fluid.

In cases where recovery takes place, the results of the previous inflammation are found, after death has occurred from some other cause, in the form of more or less extensive adhesion of the two layers of the pericardium, or merely of thickening and opacity of that membrane.

Treatment.—In idiopathic cases, if the disease be recognized in the early stage, we should advise local depletion over the præcordia by three or four leeches or cut-cups in a child of five years of age, followed by the application of warm mush-poultices, the depletion being repeated if indicated; the internal use of large doses of acetate of potash and iodide of potassium, associated with doses of veratrum viride of appropriate strength, to quiet the excessive vascular excitement; and the careful administration of nutritious diet and small amounts of stimulus, if the powers of the circulation seem likely to yield to the influence of the disease.

In the very rare instances where the disease becomes chronic, and the effusion remains unabsorbed, the treatment should consist in the repeated application of small blisters over the præcordia, and the internal use of iodide of potassium, iodide of iron, with tonics and nutritious diet.

Endocarditis.—In many cases, acute endocarditis in children occurs in conjunction with pericarditis, although it also occurs frequently as an independent affection. It is due to the same series of causes, also as have been already enumerated when speaking of this latter disease; of these undoubtedly rheumatism is far the most frequent. And as it is of far more frequent occurrence than pericarditis, and productive of even more serious results, it is necessary that we should, if possible, be more upon the alert to detect the very earliest symptoms of its presence.

In severe cases, whether occurring idiopathically, or as a complication or sequel of some other disease, there is violent disturbance of the circulation, with great dyspnœa, and short, dry cough, without any of the physical signs of pulmonary disease. The child is extremely restless, and, upon auscultation, an abnormal bruit is heard attending the heart's action.

In most cases, the mitral valve is chiefly affected in acute endocarditis, and the murmur detected on auscultation is heard over the body of the heart and to the left of this organ, and often has its seat of greatest intensity near the apex. We have most frequently observed the murmur to be systolic in time, attending and more or less obscuring the first sound of the heart, in such acute cases. Of course, this indicates the existence of some imperfection in the closure of the mitral valves, owing more or less regurgitation of blood into the auricle with each traction of the ventricle. Occasionally a double murmur. attending th the systole and diastole, and indicating roughness as well as in-fficiency of the mitral valve is heard. In more rare instances, we ve found the aortic valves to be the seat of acute endocarditis, as own by the presence of a single or double blowing murmur over the se of the heart, and transmitted most strongly upwards over the upper rt of the sternum to the second right costal cartilage.

But more frequently the acute symptoms are not so marked or char-teristic as this, and, when ensuing in the course of acute rheumatism, ay consist merely in a little increase of the heat of the skin, frequency the pulse and restlessness, with or without vague complaints of pain out the præcordia.

Absolutely the only way of recognizing such cases is by auscultation, d consequently we would urge the immense importance of carefully sculting the heart *daily*, not only in every case of acute rheumatism a child, but also in every case where anomalous febrile symptoms, ith acceleration of pulse, are present, and particularly if there be gen-al soreness, or even resistance to motion.

In very severe attacks of acute endocarditis, death may occur early; t more commonly the disease is less severe, and the urgent symptoms bside, leaving, however, in but too many cases, organic valvular dis-se.

When death occurs during the acute stage, the endocardium is found jected, reddened, softened, and readily detached from the muscular all. The lesions are most marked on the left side of the heart, and pecially on the endocardium covering the mitral valve, where, in ddition to the above-mentioned appearances, there are usually patches r rows of minute granular vegetations, which form a fine beaded line ong the free border of the valves; or, in other cases, delicate fringe-ke processes which hang from the leaflets. We have alluded at some ngth in our article on chorea, to the theory which has been framed to xplain the frequent occurrence of this latter disease in connection ith rheumatism, by the separation of minute fragments of such vege-tions, and their impaction in some of the vessels of the brain.

The treatment of acute endocarditis should be the same as that rec-mmended for acute pericarditis.

CHRONIC VALVULAR DISEASES.

There are certain general remarks which we desire to make in con-ection with these affections, which are applicable to them, without ference to the particular valve diseased: in addition to which, we ill call attention to the diagnostic signs and special features of the seases of each set of valves.

Causes—Frequency.—In very many cases, heart disease in young ildren is recognized for the first time when such marked lesions exist to convince us that the disease has already been of some considerable duration. Undoubtedly this is partly because the acute symptoms of the early stage have been entirely overlooked. This is particularly the case when the disease is rheumatic in its origin. We are convinced that acute rheumatism is often overlooked in young children, and also that endocarditis occurring in the course of such attacks not rarely escapes detection. It is, therefore, very difficult to say in what proportion of cases in young children, valvular diseases have been of acute origin. In our own experience they have, with the exception of contraction of the mitral valve, almost universally followed an attack of endocarditis. In the case of mitral contraction, however, it is quite often impossible to trace the disease to any acute attack. It would appear, therefore, either that, contrary to the usual rule in early life, this lesion is often the result of a slow degenerative, fibroid change, or else that, in some cases, it may arise in fœtal life. This latter view does not seem at all impossible when we remember how slow is the development of this lesion, and for how long a time it may remain latent.

As to the relative frequency with which the different sets of valves are affected, lesions of the mitral valve undoubtedly preponderate largely. We have, it is true, met with extreme aortic disease in quite young children, marked by all the physical signs that are familiar as occurring in the adult; but such cases have been rare compared to those in which the mitral valve was the seat of the disease.

Anatomical Appearances.—The lesions which are found in chronic valvular diseases do not differ from those which are found in the adult, nor are they materially dependent upon the mode of their origin. It is, however, probably true that in those cases which have followed acute endocarditis, it is more usual to find numerous and large vegetations upon the valves, than where the lesion has been chronic and of gradual development from the start. The lesions which are found usually, are vegetations or calcareous incrustations on the valves, or there may be thickening, contraction, and coalescence of the valves and their chordæ tendineæ, either of which conditions may be attended with contraction of the orifices of the heart, and obstruction to the passage of blood. On the other hand, the contraction of the valves may be in such a direction as to render them insufficient to close the orifice, and thus allow regurgitation. The effect of these lesions upon the walls and cavities of the heart will vary with their degree and suddenness of development. Usually they are followed by dilatation of the cavities involved, and by thickening or hypertrophy of their walls, which has usually seemed to us more constant and to bear a larger proportion to the dilatation than in adults.

Symptoms.—The general symptoms during the early stages of chronic valvular disease, are often extremely slight, consisting merely of some interference with the general development of the body; a little palpitation of the heart, and dyspnœa on exertion; occasional præcordial distress, and perhaps slight prominence of the cardiac region.

The vague character of these symptoms accounts for the fact that ter the subsidence of the acute symptoms of endocarditis, when the sease has begun in that way, such cases are very often neglected, and ceive no proper care until the occurrence of dyspnœa, cough, and ropsy, gives warning only in time to recognize the approach of the tal termination.

We make these remarks especially to call attention to the insidious mode of approach of many cases of chronic valvular disease of the eart in children: and to impress upon our readers the important practical rule that, whenever, in the investigation of a child suffering with bscure ill health, we learn of the previous occurrence of acute rheumatism, or find mentioned among the symptoms any irregularities of he circulation or action of the heart, careful physical exploration of he heart should immediately be practised.

The special symptoms which attend the diseases of the different valves, may be briefly described as follows:

Diseases of the Aortic Valves.—These affections are, as already said, comparatively rare in children. The blowing murmur which attends them is usually strong and distinct. If the lesion causes obstruction of the aortic orifice, the murmur will attend the first sound; if there be regurgitation through the valve, it will attend or take the place of the second sound. In many cases the lesion causes both obstruction and insufficiency, and there is therefore a double murmur. In either case the murmur will be heard extending from the base of the heart upward and across the sternum to the second right costal cartilage, as well as downward along that bone to the xiphoid cartilage. It is also transmitted into the arteries. The murmur is often so loud that, especially in cases of regurgitation, it may be heard down over the body of the heart to the apex; and also to a varying distance on either side of the sternum over the upper part of the chest. Occasionally also a thrill may be felt over the upper piece of the sternum, in the second intercostal space at either the right or left edge of the sternum, or at the supra-sternal notch.

The action of the heart is regular, and may not be accelerated, though exertion readily excites palpitation. The apex-beat is quick and strong, and is found after a time below and to the left of its normal position. The area of cardiac percussion-dulness also becomes moderately increased, in consequence of gradual hypertrophy of the walls of the left ventricle.

The pulse is small, quick, and in cases of regurgitation, jerking and unsustained, or receding.

In severe cases, there are marked evidences of interference with the arterial circulation. The surface is pale, and shows the insufficient amount of blood which passes through the arterial capillaries.

The respiration is usually but little disturbed, excepting in consequence of unusual exertion, so long as the lesion is limited to the aortic valve, and the walls of the left ventricle undergo sufficient compensatory hypertrophy to overcome the obstruction to the circulation.

The *prognosis* in aortic disease of moderate severity has not seemed to us unfavorable so far as regards prolongation of life. Thus, for example, we treated a girl of 9½ years, who had a violent attack of acute articular rheumatism with endocarditis. This was followed by a double aortic murmur, which persists to the present time, although she has grown up, married, and has one child. Her health is delicate, and she has very moderate dyspnœa on exertion. We have frequently observed this same tolerance of serious aortic lesions for a number of years. We have never met with a case in which sudden death occurred in the course of aortic regurgitation, as so frequently happens in adults.

Mitral Obstruction.—This interesting form of cardiac lesion would merit a more full description here than any other valvular disease, because its symptoms are somewhat peculiar, and more especially because it is of such comparative frequency in childhood.

Its origin, as we have already remarked, is usually insidious, and it is frequently impossible to gain any history of acute disease in cases where marked mitral obstruction is detected.

The general symptoms which first attract attention to the heart are rarely noticed before the age of 7 or 10 years; and we may then learn that during previous years the child has seemed as active and playful as usual, or that he has always shown an indisposition to active play or exertion, and has become tired readily. Attention is attracted to the heart by the increasing tendency to dyspnœa and palpitation on exertion, and by the readiness with which cough of a bronchial character is contracted on very slight exposure. Occasionally during these attacks of bronchitis with pulmonary congestion, hæmoptysis may have occurred. Examination may now show the existence of prominence of the præcordia; and the area of cardiac dulness is usually increased, though not to a marked extent. Frequently a thrill can be felt over the præcordia, and careful examination will show it to occur just before the apex-beat. We have known this thrill to begin distinctly about the base of the heart, and to extend quickly down towards the apex, terminating as the apex-beat was noticed. On auscultation, a murmur, usually of a low, hoarse, or churning character, is heard, which presents these additional peculiarities: it is generally distinctly *presystolic or auriculo-systolic* in time, occurring, that is, in the long period of silence preceding the first sound; its relation to the phenomena of the cardiac action can usually be determined without difficulty by observing that it follows the second sound, and that it stops just before, or else runs into, the time of the first sound and the pulse of the carotid artery. This murmur, also, although usually quite strong, is, as a rule, remarkably localized in comparison to other valvular murmurs: its seat of greatest intensity is at or near the apex, and it loses force rapidly on leaving this point in any direction. Attention to the peculiar physical signs above given, as well as to the general symptoms, will generally render the diagnosis clear.

The prognosis, as regards prolongation of life and maintenance o comfort, is comparatively favorable; as regards improvement in th organic condition of the heart, it is of course entirely the reverse. W ave under our care at present a lad of 16 years of age who presents he typical symptoms of mitral obstruction, but who, by care in his anner of living, enjoys entire comfort. Usually, however, the frequent recurrence of pulmonary congestion injures more and more seriusly the equilibrium of the heart's circulation and the efficiency of he right ventricle, and eventually grave symptoms of failure of cardiac ower, with general venous stasis, appear, and increase until a fatal esult occurs.

Mitral Regurgitation.—This, which is the most frequent form of cariac disease in young children, depends upon inflammatory alterations n the mitral valve, which render it insufficient to close that orifice uring the systole of the left ventricle. In most cases it arises from an acute endocarditis, chiefly of rheumatic nature. In this condition, as in the last, the pulmonary circulation is apt to be disturbed from time to time, and therefore the early general symptoms which attract attention to the thoracic organs are usually shortness of breath on exertion, liability to cough, and palpitation of the heart. Of course, where we are in attendance upon the case of rheumatism when the acute cardiac inflammation occurs, the fact will be recognized by the symptoms detailed under the head of acute endocarditis. But unfortunately it often happens that this acute stage is quite overlooked, and we would therefore again urge the importance of a careful physical examination of the heart in every case where a child is brought to us complaining of vague symptoms of embarrassed breathing, though no suspicion has ever been raised of the existence of heart disease. Sometimes, indeed, much more marked general symptoms will have appeared, as, for example, severe dyspnœa on exertion, pulmonary congestion with cough and moist or dry râles over the posterior parts of the lungs, palpitation of the heart, lividity of the lips and fingers, and even œdema of the feet.

On physical exploration we often find prominence of the præcordia, with signs of more considerable hypertrophy and dilatation than in cases of mitral obstruction. The impulse is extended and too forcible, or may even be heaving; it is rarely attended with any thrill. On auscultation a blowing murmur, which varies very greatly in different cases in its force and character, will be heard accompanying or replacing the first sound of the heart. This murmur is heard at the base, and is transmitted most strongly towards the apex, where it often has its point of greatest intensity. It is also strongly transmitted to the left of the apex, being well heard in the infra-axillary space on the level of the apex-beat, and frequently, also, on the dorsum of the left chest, at the angle of the scapula. The only other form of valvular disease with which it is possible to confound this is mitral obstruction; but attention to the evident points of difference noted above will render the diagnosis easy in most cases.

The prognosis varies extremely in different cases, depending upon the extent and rapidity of development of the lesion; the completeness with which the disturbance of the circulation is compensated by the hypertrophy and increased power of the walls of the left ventricle; and the vigor of the system and the preservation of the tone and nutrition of the muscular fibre of the heart. This form of heart disease illustrates more clearly than any other the more favorable prognosis which may be made in many cases of organic valvular disease in children, as compared with the same condition in adults. This depends partly upon the fact that when the lesion is not extensive, and when the patient is placed under favorable circumstances, the heart accommodates itself in its growth to the defective state of the valves, and overcomes the impediment to the circulation by acquiring increased propulsive force.

Not only, however, are the valvular lesions in childhood thus partly compensated by hypertrophy of the walls of the heart, but there is also an undoubted tendency, in some favorable cases, for the valvular lesions, both mitral and aortic, themselves to diminish. Thus among the following cases, which we have selected from a large number of records collected in our practice, there will be found several where positive abnormal bruits, due to organic valvular disease, have gradually disappeared in the course of years.

Acute articular rheumatism; endocarditis; recovery; murmur persistent but diminishing.—H. S., a boy, æt. 12 years, had a severe attack of acute articular rheumatism in April, 1869, with swelling, redness, and pain of joints; a systolic murmur appeared at the apex without any pericarditis. He recovered, under the use of alkalies and opium. In November, 1869, seven months after the attack, he seemed perfectly well; had no dyspnœa except on violent exertion. The murmur at the apex is still audible, but less marked than three months ago, when he was last examined.

Acute endocarditis (rheumatic?); marked improvement in general symptoms, but persistent murmur.—B. H., a girl, at age of 4 years suffered from an ordinary catarrh, when we detected a loud, high-pitched murmur at the apex, and, on inquiry, learned that, when 2½ years old, she had a violent inflammation of the chest, supposed to be catarrhal fever. At present, at the age of 12 years, she is in excellent health, without any of the rational signs of cardiac trouble, but she still has a well-marked, rather prolonged, high-pitched, systolic murmur at the apex.

Repeated attacks of rheumatism with severe mitral disease; improvement in general symptoms and force of the murmur.—L. S., a girl, was subject to attacks of rheumatism from very early age, and has presented symptoms of cardiac disease from infancy. At age of 13, there was a strong systolic murmur heard over base and toward apex. She suffered much from violent palpitation, pain in præcordia, headache, and habitual dyspnœa, much increased on exertion. At age of 18, there is still a systolic mitral murmur, but of much less intensity than formerly. Her general health is excellent, and she has but little dyspnœa or palpitation at any time. The heart's action is still readily excited; the impulse strong, but without thrill; there is marked increase in the area of cardiac dulness, but no positive prominence of the præcordia.

Acute rheumatic endocarditis, chronic mitral disease; recovery in five years.—F. B., a girl, at the age of 6 years, was attacked with slight rheumatic fever, without any articular symptoms. In a few days, a distinct but not loud, rather low-pitched systolic murmur was heard at the apex. The treatment consisted of rest in bed, quinia and Dover's powders. After ten days, all the acute symptoms disappeared, but the murmur continued. She regained her health, but for two years the murmur could be detected, but then gradually diminished; and now, five years after first attack, no murmur can be detected, the first sound at the apex being merely a little prolonged. Her general health is excellent.

however only when the general nutrition of the patient is good,
the tonicity of the heart's tissue is preserved; and when all ex-
and exertion, which could overtax the energies of the crippled
are carefully avoided, that such compensation and gradual re-
are possible.

n cases where the vigor of the heart's action fails, and degene-
changes occur in its muscular tissue, the tonicity of the walls
iminishes, and allows the development of passive dilatation of
ities. In this condition it is not long before the most grave
ms of embarrassed circulation appear, and the case passes more
rapidly through the stages common to fatal organic disease of
rt.

following case may be quoted as a full illustration of the latter
s, in regard to the effect of exposure and exertion in inducing
result in cases which otherwise might have gradually improved.

ted attacks of acute rheumatism in early childhood; valvular disease and hy-
y; gradual improvement; exposure to hardships of army life; rapid aggra-
f symptoms and death.—W. D., male, as a young child suffered from repeated
of acute articular rheumatism with cardiac complication. At the age of 9,
hard pronounced him to be suffering from valvular disease and hypertrophy
eart.

ondition was gradually improving, and he had so few symptoms of cardiac
that, at the age of 18 years, he was able to enter the infantry service. At the
one year, however, he was discharged for disability, and when seen by us in
64, presented the following symptoms: bulging of præcordia; marked exten-
the cardiac impulse, which was heaving and powerful; marked increase in
of cardiac dulness from the presence of pericardial effusion; and strong sys-
tral murmur. He had lost flesh; the surface was sallow and lips livid; there
uent cough with occasional hæmoptysis and epistaxis; the liver was enlarged,
re was frequently œdema of the feet.

rds the close of the year, the heart's action grew more labored and feeble, the
hready and frequent, the entire body became anasarcous, and considerable
appeared. He suffered from constant orthopnœa and frequent cough, with

contraction, and there merely remained a very thick fibrous ring, studded with calcareous masses, bounding the auriculo-ventricular opening.

The muscular tissue of the heart presented an incipient state of fatty degeneration.

The liver was enormously enlarged, reaching nearly to the umbilicus, and presented intense nutmeg congestion.

The kidneys were large and congested; and the spleen was three times its normal size.

TREATMENT.—Having spoken somewhat in detail of the symptoms and prognosis of the different forms of valvular disease in children, it remains to make some general remarks upon their treatment. In the management of such cases, as in adult life, the most important point to be attended to is the careful regulation of the mode of life. The child should be warmly clothed, and carefully protected from any exposure which might induce an attack of rheumatism; all violent exertion of body or mind should also be avoided, and, so far as possible, all sudden emotions, as fright or anger. On the other hand, care should be taken that proper gymnastic and outdoor exercise should be regularly taken in such ways as to invigorate the frame and strengthen the muscular system, without producing too much exhaustion. The diet should be nutritious and digestible, and if the appetite should fail, and the child appear weakly and pale, vegetable tonics, with iron, should be administered.

The appearance of symptoms of pulmonary congestion, or of catarrh, should attract immediate attention, and lead us to employ counter-irritation and suitable expectorants to relieve the lungs.

In cases where the heart's action is excited, and too frequent and powerful, while evidences of excessive hypertrophy begin to show themselves, we should employ cautiously veratrum viride or aconite to control it. When, on the other hand, any of the cavities of the heart are subjected to overstrain from valvular obstruction or insufficiency, and the heart is acting irregularly and inefficiently, the greatest benefit will be obtained from the use of digitalis. Indeed, in many instances we have observed, under the prolonged use of this drug, very great permanent improvement, gradually showing itself both in the action of the heart and in the general symptoms.

Severe paroxysms of palpitation, should they occur, require the use of antispasmodics, diffusible stimuli, and revulsives, just as are indicated under the same circumstances in the adult.

In cases of rheumatic origin especially, we have thought that good results, in regard to the progress of the organic changes in the heart, have followed the prolonged use of iodide and bromide of potassium, given with due regard to the danger of developing an anæmic state of the blood by the uninterrupted administration of these drugs for a long time.

On the whole, as we have already said, there is reason to be somewhat hopeful in the treatment of chronic valvular disease of moderate severity in young children, bearing in mind the wonderful power which the growing heart possesses of compensating such lesions, so long as by careful attention to hygiene and medical treatment we are able to preserve the tone and nutrition of its muscular tissue.

CHAPTER I.

DISEASES OF THE MOUTH AND THROAT.

ind ourselves much embarrassed as to what classification of the
of the mouth is the most proper to adopt. So much confusion
mongst authors as to the nature of these affections, and conse-
as to their nomenclature, that it is very difficult to reconcile
ious discrepancies which exist. After much consideration, how-
e believe that the following arrangement is the one best suited
xisting state of knowledge upon these affections:

mple or erythematous stomatitis.
llicular stomatitis, or aphthæ.
lcerative, or ulcero-membranous stomatitis.
ngrene of the mouth.
rush, or stomatitis with curd-like exudation.
ffections of the tonsils.
mple, or erythematous pharyngitis.
tro-pharyngeal abscess.

e previous editions of this work, we described pseudo-membran-
ryngitis in this place, but further observation and research have
established the fact that this is but the local manifestation of a
utional affection, diphtheria; and we have accordingly given a
ount of the whole subject, under this latter name, in the section
stitutional diseases.

ing stage of other kinds of stomatitis, and of little importance, se requiring the attention of the physician.

The *causes* of the disease are the introduction of irritating substa such as hot drinks, and acrid or caustic preparations, into the mo difficult dentition; and probably sympathy with disordered stat the stomach. It occurs not unfrequently as a secondary affec particularly in the course of measles, scarlet fever, and small-pox.

The *symptoms* of erythematous stomatitis are more or less vivid ness of the mucous membrane, sometimes diffused, and at others p tated or disposed in patches; slight swelling of the same tissue; l and tenderness to the touch, and also in the act of sucking or ea The child is generally fretful and restless, and either loses its app or refuses to nurse or take food freely, on account of the tenderne the mouth. There are seldom any general symptoms except in sec ary cases, in which they are those of the primary affection.

The *treatment* is very simple. It consists in the use of some de cent wash, as gum-water, sassafras-pith mucilage, a little honey p the tongue occasionally, and if the inflammation be at all consider in the application of some astringent preparation. This may co of honey and borax, two or three parts of the former to one of the la or of the following wash, recommended by M. Bouchut:

℞.—Mel. Rosæ, ...	f℥j.
Aluminis, ...	ʒss.
Aquæ distillat., ...	f℥ss.—M.

The application of any of the washes recommended is best mad means of a thick and soft camel's-hair pencil; or it may be done wi soft rag, which should be dipped in the wash, and then conveyed the mouth on the point of the finger. The remedy ought to be several times a day.

If signs of gastric or intestinal disorder are present, they shoul attended to.

ARTICLE II.

APHTHÆ.

Definition; Synonyms; Frequency; Forms.—The term ap ought to be restricted to the vesicular and ulcerous form of disea the buccal mucous membrane, in which that tissue is covered wit eruption of vesicles which break, and are followed by small rou ulcerations. Under this title writers formerly confounded the affe we are now considering with ulcerative stomatitis and thrush. called by Billard follicular stomatitis, and by several other writers v ular stomatitis.

uency of the disease is very considerable. We shall describe
, the *discrete* and *confluent*.

—The only causes which seem to have been ascertained with
e of certainty, are early age and the process of dentition:
t of irritating substances, particularly stimulating and acrid
f food, with the mucous membrane of the mouth; and the
of some morbid irritation of the digestive tube, especially of
ch. The confluent form is often connected with severe gen-
se of the constitution.

MS; DURATION.—Aphthæ begin in the form of small red eleva-
ing little white points upon their centres, which consist of
elium of the mucous membrane raised into vesicles. The
re small in size, oval or roundish in shape, and of a white or
r. They soon break and allow the fluid which they contained
, after which there remains a little rounded ulcer, with exca-
more or less thickened edges, and surrounded almost always
circle of inflammation. The bottom of the ulcers is usually
ish color.[1] There is seldom any diffuse inflammation of the
nembrane in this disease. The *number* of aphthæ varies in
forms. In the discrete variety there are but few, whilst in
uent form they are, of course, much more numerous. They
appear first on the internal surfaces of the lips and gums,
on the inside of the cheeks, edges of the tongue, and soft

crete form is generally accompanied by symptoms of slight
of the digestive organs, consisting of thirst, acid eructations
ng, imperfect digestion, and a little constipation or diarrhœa.
uent form, which is much more rare, especially in very young
sually coincides, as has already been stated, with severe gen-
cal disease.

ration of aphthæ is different in the two varieties of the affec-
e discrete form generally pursues a rapid course, lasting from
nning to the time of cicatrization, between four and seven
metimes, however, when the vesicles are formed successively,
the other, the disease lasts much longer. The confluent
ursues a much slower course, and is much more difficult of

OSIS AND PROGNOSIS.—The diagnosis of discrete aphthæ is not
ficult, in consequence of their being isolated and succeeded by
d limited ulcerations. The confluent form, on the contrary,
confounded with ulcerative or ulcero-membranous stomatitis,
thrush. From the first-mentioned disease it may be distin-

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ayish or yellowish-gray secretion, on the base of the aphthous ulcers, has
closely studied by Dr. J. Worms (Glasgow Med. Jour., July, 1864), who
both microscopical examination and chemical tests invariably show its
nature. It is his opinion, therefore, that aphthæ are the acne of the mu-
ranes; in support of which, it will be remembered, that they are found
ently where the muciparous glands are most abundant.

guished, however, by attention to the circumstances that that affection begins by small white patches, and not by vesicles, as do aphthæ; that the ulcerations which follow the patches are covered with true pseudo-membrane; and that the white patches just spoken of appear first upon the gums, whilst aphthæ generally begin upon the posterior surface of the inferior lip, and upon the tongue. From thrush it is to be distinguished by the facts that that disease commences by white points, which are not vesicular, and which, running together, form a creamy exudation; by the absence or very small number of ulcerations; and by the presence of the peculiar fungus of thrush.

Discrete aphthæ constitute a very mild disorder. They always recover without much difficulty. The confluent disease is more serious, because its progress is much slower, its cure more difficult, and because it is often connected, as has been stated, with some other severe disease.

Treatment.—Aphthæ, particularly the discrete variety, require in general, very simple treatment. The means to be employed are *general* and *topical*.

The *discrete variety* usually requires only topical remedies, regulation of the diet, and when there are marked symptoms of gastric derangement, the exhibition of some mild emetic, or of a laxative dose. The *local treatment* should consist of applications of demulcent preparations, as the mucilages of slippery elm, sassafras pith, flaxseed, marsh-mallow root, quince-seed, &c., which are to be used pure when there is no pain, or with the addition of a few drops of laudanum or wine of opium, when the mouth is sore and tender; the aphthæ ought to be touched occasionally with the mixture of borax and honey, or the aluminous preparation recommended for simple stomatitis. The applications must be made several times a day with a camel's-hair pencil, a pencil made of charpie or cotton, or with a soft rag covering the finger. When the ulcers which follow the vesicles fail to cicatrize rapidly under the above applications, or when they are numerous and painful, their cure may be very much hastened and the pain quickly relieved, by touching them lightly with a stick of nitrate of silver, or a piece of alum, sharpened to a point; or we may employ a pencil dipped into a strong solution of nitrate of silver, or into a mixture of one part of muriatic acid to two of honey. Ether has been highly recommended as a local application, by Dr. J. Worms, who, as already stated, has observed the fatty nature of the deposit in aphthous ulcers.

The *general treatment* of discrete aphthæ need consist of nothing more than the prescription of a simple, unirritating diet in most of the cases. If, however, the digestive apparatus is deranged, the case must be treated according to the symptoms; by antacids or a gentle emetic, when the tongue is foul and the secretions acid; and by the use of a mild laxative, as castor oil, magnesia, or rhubarb, when there is constipation. When diarrhœa is present, we should resort first to a small dose of castor oil or syrup of rhubarb, with the addition of half a drop to two drops of laudanum, according to the age of the child, and after-

o astringents and opiates, as will be recommended in the article
ple diarrhœa.
treatment of *confluent aphthæ* must depend on their cause. The
eatment is the same as that for the discrete variety, except that
zation should be resorted to at an earlier period. When they
o depend upon a general morbid condition of the constitution, as
ital debility, a scorbutic diathesis, or upon chronic affections of
estive organs, they must be treated in the first place by properly
ted and nutritious diet, and by the exhibition of tonics and gentle
ants, particularly, iron, quinine, and small quantities of very fine
andy; and in the second case, in the manner which will be rec-
nded for chronic derangements of the stomach and bowels, when
ne to treat of the diseases of those organs.

ARTICLE III.

ULCERATIVE OR ULCERO-MEMBRANOUS STOMATITIS.

NITION; SYNONYMS; FREQUENCY.—This form of sore mouth is
terized by a secretion upon the mucous membrane of a plastic
ion in thick, yellowish, adherent patches, and by inflammation,
, or ulceration of the subjacent tissues. It is the same disease as
htha gangrenosa, and, we believe, the cancrum oris also of Under-
the ulceration of the mouth of Dewees and Eberle; the stom-
ouenneuse, and the ulcerative and pseudo-membranous forms of
matite gangreneuse of M. Valleix; the stomatite pseudo-membra-
or diphtheritique of some writers; and the stomatite ulcero-mem-
se of MM. Rilliet and Barthez. It is the disease described under
le of gangrenous sore mouth by Dr. B. H. Coates (*North American*
al and Medical Journal, vol. ii, 1826), with the exception of a few
which were what we shall treat of as gangrene of the mouth.
he different titles given above, we prefer that of ulcero-membra-
tomatitis, as most expressive of the distinctive features of the dis-
This form of stomatitis is not very *frequent* in private practice,
metimes prevails extensively in hospitals, and other public insti-
s for children, where it often assumes an epidemic character.
SES.—The *predisposing causes* are epidemic influence, of the exist-
f which we believe there is no doubt; according to some observ-
ntagion, which, however, has not as yet been positively shown;
ad hygienic conditions as to cleanliness, ventilation, food, cloth-
d habitation. That it is epidemic, we have no doubt from our
xperience, since we are rarely called to a case without soon meet-
th others, while we sometimes pass several months without seeing
e example of the disease. We have also known it to be endemic in
ehold, having on one occasion met with seven cases in two families

of children residing under one roof, on two other occasions with three cases, and on several others with two. It is most frequent between the ages of five and ten years, though it may attack all ages, and is more common in boys than girls. It occurs during the convalescence from severe diseases, as pneumonia, the eruptive fevers, typhoid fever, entero-colitis, and other affections of children.

The *exciting causes* of sporadic cases are unknown, with the exception, perhaps, of the presence of a carious tooth in the mouth, and fracture or necrosis of the maxillary bones.

SYMPTOMS; COURSE; DURATION.—The disease begins with slight pain and uneasy sensations in the gums, which then become swelled, red, bleeding when touched, and are soon after covered with a grayish, pultaceous exudation of varying thickness. The exudation extends from the gums to the internal surface of the lips and cheeks, and sometimes, but more rarely, to the soft palate, and even to the pharynx and nasal passages. The plastic deposit occurs in the form of small, and slightly projecting, yellowish patches, which approach each other, unite, and form bands of pseudo-membrane, somewhat uneven upon the surface, and adhering with considerable force to the tissue beneath. When the exudation is detached, the mucous membrane is found to be of a red or purple color, bleeding, and excoriated or ulcerated. The ulcerations which exist under the false membrane are of various depths, of a grayish, livid, or blackish color, with swelled, softened, and livid red, or bleeding edges. Those which are formed upon the inside of the lips are rounded in shape, whilst those seated in the angle between the lips and gums, are usually elongated. In mild cases of this affection, the local symptoms, though perfectly characteristic, are less severe than those just now described. The ulcerations are often few in number, amounting to four, five, or six upon the tongue, to a few scattered over the inner surfaces of the lips, and to some upon the gums, and especially about the necks of the teeth. The other symptoms are the same as those above mentioned, with the exception that they are milder in degree.

When the disease is mild, and when it is properly treated, the false membranes become detached, leaving the mucous tissue merely excoriated, in which case it soon regains its natural condition; or else the ulcers which exist beneath rapidly become healthy and cicatrize. In violent cases and in those badly treated, the inflammation, on the contrary, persists; the pseudo-membranes increase in thickness, or if detached, are formed anew; the ulcerations become deeper; the disease extends; and the case lasts an indefinite period of time.

Other symptoms, besides those we have mentioned, characterize the disease.

The *breath* is always more or less fetid, and in bad cases, almost gangrenous. The *salivary* and *submaxillary* glands are generally more or less swelled, hard, and painful, and according to some authors, the surrounding cellular tissue is in the same condition, though this is denied by others. The *movements* of the lower jaw are stiff and painful in

cases. *Deglutition* is not affected unless the disease extends to the
x. In violent cases there is usually a copious *discharge* of fetid,
saliva, or of bloody serum, which flows from the mouth during
When the ulcerations are deep and large, the tissues beneath
re or less swelled; the swelling, however, rarely assumes the
esisting, circumscribed characters, with the tense, smooth, hot,
ining appearance of the skin, which exists in true gangrene of
uth. In most of the cases there is a moderate but decided *feb-*
ction, especially at the invasion. This usually subsides or disap-
fter two or three days, though it sometimes increases if the dis-
comes extensive.

disease begins, as already stated, on the gums, and unless limited
e parts, as sometimes happens, extends to the lips and cheeks.
y of the cases it attacks only one side of the mouth, and this is
requently the left than the right.

course of the disease is usually rapid in epidemic cases, and in
which are properly treated. Where badly treated, on the con-
t may last from one to several months, or terminate in gangrene
mouth.

NOSIS; PROGNOSIS.—The *diagnosis* is, as a general rule, very easy,
er attention be paid to the characteristic features of the disease.
as already stated, been very often confounded with gangrene of
outh. The method of distinguishing between the two will be
n full in the article on that disease. From thrush it is to be dis-
hed in the manner which will be pointed out when that disease
under consideration.

prognosis is favorable in the great majority of the cases. Spo-
cases probably always terminate favorably. The epidemic dis-
hough rarely fatal, sometimes proves so from its extension to the
nx and larynx, or from its termination in gangrene of the mouth.
ave seen a large number of cases in private practice, and have
as yet known one to become gangrenous or to prove fatal. Of
ds of 120 cases of this kind, observed by Dr. Coates at the Phila-
a Children's Asylum, in a period of three months, all but one
red (*loc. cit.*, p. 21). The cases which occur in the course of
diseases are not dangerous in themselves, but are so as being the
f a great severity of the primary affection.

ATMENT.—The treatment may be divided into *general*, and *local* or
. The *general treatment* should consist in most of the cases in at-
n to the diet, which ought, in healthy and vigorous children, to
ple and unirritating, and in those who are weak and debilitated,
ous and digestible. If the bowels are costive, or the child fe-
and uncomfortable, a laxative dose may be given with advan-
or some simple diaphoretic, as nitre and water, or the neutral
re, may be used through the day, and a warm foot-bath or an
sion-bath given in the evening. When the constitution is feeble,
e child weak or anæmic, tonic remedies are indicated. The best
bably quinine, or one of the ferruginous preparations; or the com-

pound infusion of gentian, with addition of Huxham's tincture of may be resorted to. The best internal remedy, however, and i the only one of any kind that is necessary in most cases, is the chl of potash, which possesses a stimulant and alterative action upo mucous membranes. This is spoken of in the highest terms by West, of London, who regards it almost as a specific. We have it now for many years past in a very large number of cases, and seldom found it necessary to employ any other means, excepting mild cathartic dose where the bowels have been constipated, a wash of borax or alum in honey of roses, or borax in simple h The symptoms have begun to amend in every case in from thr four or five days, and recovery has taken place in about a week little more. The dose is from two to three grains every four for a child three years of age, and four and five grains for one of or ten years. Mr. Hutchinson (*Med. Times and Gaz.*, 1856), wh lieves also that this salt is almost a specific in this affection, r mends it in larger doses than the above, giving as much as five g thrice daily, to an infant of one year old. We have usually prese it in the dose of two grains four times a day, in a mixture of of ginger and water, for children three or four years old.

Prior to the discovery of the efficacy of the chlorate of potash in affection, the *local treatment* constituted the only effectual and re means of removing it, and the most violent and painful applica were thought necessary and were made use of. Strong solutio nitrate of silver, and pure or diluted muriatic acid, were frequentl ployed in severe cases. Now, however, these caustic substances probably be entirely dispensed with, except in cases that show a dency to assume the form of gangrene of the mouth. In ordi cases the only local applications that need be used, and these ar essential when the child resists very much, are demulcent wash keep the mouth clean, to be employed in the manner recommend the article on aphthæ, and some mild astringent wash. This may co of borax and honey, or borax and sugar, in the proportion of two or parts of the former to one of the latter, or, what is in my opinion erable to either of these, of a drachm of borax rubbed up with an o of honey of roses.

Should the disease resist the treatment by the chlorate of potas the simple washes just now recommended, we may employ the fo ing combination, proposed by Dr. Dewees, and of which he says it "has so far never failed us."

℞.—Sulph. Cupri, ...	gr. x.
Pulv. Cinch. Opt., ...	ʒij.
Pulv. G. Arab., ...	ʒj.
Mel. Commun., ...	fʒij.
Aquæ Font., ...	f℥iij.—M. et ft. sol.

The ulcerations to be touched with the mixture twice a day, the point of a camel's-hair pencil. Or, we may resort to the follo

, recommended by Dr. Coates (*loc. cit.*), and of which he says, that "settled down, after various trials, in the employment of the fol-ing:

℞.—Sulph. Cupri,	ʒij.
Pulv. Cinchonæ,	℥ss.
Aquæ,	f℥iv.—M.

be applied twice a day, very carefully, to the full extent of the erations and excoriations."

IM. Rilliet and Barthez recommend very highly the plan pursued M. Bouneau at the Children's Hospital. This is to cleanse the uth first, and then to apply dry chloride of lime (calx chlorinata of Pharmacopœia) to the diseased surfaces. The application is made means of a piece of rolled paper, or a stiff pencil, which is to be istened and then dipped into the powder so that some may adhere, with the finger. The surfaces are to be gently rubbed with the wder, and after a few moments' contact, washed clean with pure ter. This is to be done twice a day, until the ulcerations assume clean, healthy appearance, after which the following mouth-wash to be employed:

℞.—Mucil. G. Acac.,	f℥j.
Syrup. Cort. Aurant.,	f℥ss.
Calc. Chlorinat.,	℈j.—M.

The chief danger from the disease depends on the circumstance that ometimes terminates in gangrene of the mouth, to be presently de-ibed. Any disposition to such a termination should be carefully tched, and the proper preventive means, consisting of local stimu-ing or caustic applications, with the internal use of stimulants and ics, be at once resorted to.

ARTICLE IV.

GANGRENE OF THE MOUTH.

Definition; Synonyms; Frequency.—Gangrene of the mouth is an fection which occurs chiefly in children of debilitated constitution, d especially as a sequel of some of the eruptive fevers. It begins nerally by ulceration of the mucous membrane of the cheek, which ter a longer or shorter time, runs into gangrene, and extends rapidly the gums; after a few days, if the disease be not arrested, the cen-al tissues of the cheek become thickened and indurated, an eschar forms upon the integument, and spreads in depth and width, until a last the cheek may be perforated, the whole side of the face and jaw destroyed, the teeth loosened, and the maxillary bones exposed and necrosed. It is known by a great variety of names: gangrænopsis, cancrum oris, gangræna oris, canker of the mouth, gangrenous erosion of the cheeks of Underwood; necrosis infantilis, gangrenous stomatitis, &c. It is a *frequent* disease in the hospitals for children in Europe, and a not uncommon one in institutions of the same kind in this country. It sometimes prevails endemically in hospitals. It is a rare disease in private practice, and we have as yet met with but few cases, excepting in public institutions.

Predisposing Causes.—The disease is nearly, but not exclusively confined to the period of childhood. It is most common between the ages of three and six years; is very rare, but does sometimes occur in infants; and is of nearly equal frequency, probably, in the two sexes. Unfavorable *hygienic conditions* constitute a strong predisposing cause. Children living in hospitals or any crowded institution; those whose parents are poor or in want, and whose constitutions have been greatly deteriorated by long illness, by the tubercular diathesis, or by acute diseases, are particularly apt to be attacked. It almost always follows upon some previous acute or chronic disease, particularly measles, or some other acute exanthem; pneumonia; entero-colitis; hooping-cough; long-continued malarious fevers, &c. MM. Guersant and Blache say (*Dict. de Med.*, t. 28, p. 601), "The existence of some anterior disease is a necessary condition of gangrene of the mouth; we have never known it, nor has M. Baron, to occur as an idiopathic affection." It has been affirmed by some persons to be *contagious*, but this is exceedingly doubtful. The fact of its occurring sometimes in an endemic form has already been referred to. It has been known also to prevail as an epidemic.

The *exciting causes* can rarely be ascertained with any certainty. The only one which seems to have been proved to exist in some instances is the exhibition of large doses of the mercurial preparations, and even this is questioned by some very good authorities.

Anatomical Lesions.—Upon examination after death, it is found that the *integument* surrounding the mortified spot soon runs into putrefaction. The lip or cheek in which the disease is seated is swelled, hardened, tense, and shining, of a purple or greenish color, and presents a deep, circumscribed engorgement. On the most prominent part of the swelling there often exists a rounded or oval, and distinctly limited eschar, of variable size, from a third of an inch to an inch, or even more, in diameter. In some instances the cutaneous slough is much larger, and extends irregularly to different parts of the face, to the chin, neck, eyelids, and even to the neighborhood of the ear, so as to occupy the whole of one side. Under these circumstances the tumefaction is neither so considerable, nor so regular, as when the slough is smaller. The eschar is always black, and generally dry and parchment-like, and extends a third or two-thirds of a line in depth, or quite rough the integument. The tissues beneath the skin are not gener- y implicated, though in some cases the eschar is detached and there a perforation of the cheek through which may be seen the alveolar ocesses.

The *mucous membrane* of the mouth is always affected with mortifi- tion. The disease may be limited, so as to exist in the form of an ongated ulceration, of a dark grayish color, situated in the fold where e mucous membrane is reflected from the cheek to the lower jaw; , in a larger proportion of cases, it is seated on the internal surface the cheek, opposite the interval between the alveolar processes. ometimes the disease is much more extensive, and occupies all or a art of the internal surface of the cheek. In such instances the whole ickness of the mucous tissue is destroyed, and it presents upon its rface a blackish or brownish pultaceous slough, almost liquid in con- stence, which may be scraped off with a scalpel, leaving beneath loose reds of mucous membrane, without any trace of organization. The ums frequently participate in the disease, and are converted into reds, or completely destroyed.

The *maxillary bones* are sometimes, in severe cases, when the disease as extended to the gums, exposed, blackened, and even necrosed. The *eth* are very often uncovered and loosened, and not unfrequently some re lost. The *tissues* between the skin and mucous membrane are found ither hardened and infiltrated, or sphacelated to a greater or less ex- ent. In the least severe cases, the fatty cellular tissue and the mus- ular structure of the cheek are infiltrated with serum, but preserve eir organization. When the disease is more aggravated, the gangrene xtends to these tissues also, and always to those adjoining the mucous embrane first; so that the cellular structure beneath that membrane, nd then the muscles, are infiltrated with a sanious fluid, and either in state of sphacelus or tending thereto, whilst some of the adipose issue beneath the skin is still merely infiltrated. In yet worse cases, he sloughs formed on the two surfaces of the cheek come into contact, and if their separation from the sound parts has taken place, a perforation is the consequence.

The condition of the *bloodvessels* in the midst of the diseased parts has been carefully examined by MM. Rilliet and Barthez. These authors state that when the tissues of the cheek are merely infiltrated, the vessels remain healthy, permeable, and their parietes are scarcely or very slightly thickened. When the vessels run along the edge of the slough, they are still permeable, but their walls are thickened, and begin to assume the appearances of the mortified tissues. Lastly, when they traverse the centre of the eschar, they can still be traced out, but their canals are found obliterated by coagula, in the whole extent of the mortified parts; or else the coagula occupy the vessels at their points of entrance into and exit from the slough, while between these points their walls are thickened, tend to assume the color and softness of the putrefied tissues, and their canals are filled with pultaceous gangrenous matter. The writers quoted do not suppose that the obliter-

ation of the vessels is the cause of the sphacelus, since that ch
occurs only after the death of the surrounding tissues has already t
place.

The disease very rarely occurs on both sides of the mouth at o
though this does occasionally happen.

The *submaxillary glands* are nearly always in their natural condit
but in rare instances are softened and engorged.

Gangrene of the mouth never, or very rarely, indeed, exists wit
lesions of other organs. Of these the most frequent are acute pul
nary affections, and after them, acute or chronic diseases of the gas
intestinal tube, and then malarious fevers, pleurisy, pneumothorax, p
tonitis, and nephritis.

SYMPTOMS; COURSE; DURATION.—The following account of the sy
toms of the disease is taken chiefly from the work of MM. Rilliet
Barthez. Gangrene of the mouth generally begins during the co
or convalescence of some acute or chronic disease, by ulceration, a
thæ, or phlyctenæ of the mucous membrane, and, in rare instances,
œdema of the substance of the cheek. At the same time the fac
pale, and usually continues so throughout the disease; the nostrils
eyelids are often incrusted, and the latter infiltrated or sunken,
surrounded by bluish circles; the lips are swelled and covered w
scabs, or dry. The breath of the child is fetid from the beginni
and, as the disease progresses, becomes gangrenous. There is but li
fever at first, unless the case be accompanied by some acute disea
the pulse is commonly frequent and small in the beginning, ris
gradually from 80 or 90 to 100 or 120, and becoming insensible towa
the end. In cases occurring in the course of other diseases, the p
rises sometimes to 120 or 140, and is larger and fuller. The chil
generally languid and quiet at first, or more rarely cross and peevi
The strength may be either lost entirely, merely diminished, or the
tient may retain a sufficient amount of force to sit up and observe w
is going on around, and even to leave the bed the day before dea
Half the children observed by MM. Rilliet and Barthez, in whom
symptom was noted, sat up in bed until within a few days of the fa
termination. In most cases but little complaint is made of pain in
mouth, though in some it is said to be severe.

The ulceration already spoken of as forming the first symptom
the disease is generally of a grayish color, and resembles very clos
that which exists in the ulcero-membranous form of stomatitis.
may be seated either on the gums, in the fold formed by the juncti
of the cheek or lip with the gum, or on the inside of the cheek, op
site the space between the alveolar processes. It may present a g
grenous appearance from the first day, or not until after two or th
days; or lastly, it may pass through the stages characteristic of ulce
tive stomatitis, and terminate in the affection under consideration.
B. H. Coates (*loc. cit.*) describes, under the title of gangrenous s
mouth of children, the ulcero-membranous form of stomatitis, and
few cases of gangrene, and states that three or four children out of

d with ulcerated gums "suffered small spots of mortification,
ne, by the delay arising from the tardy report of a nurse, suffered
sis in a portion of an alveolus."

ulcerations just described assume the following appearances as
angrenous nature of the malady develops itself. They become
sh, and then dark in color, bleed easily when touched, and are
ed with pultaceous sloughs, exhaling a characteristic fetid odor.
gangrene extends to the neighboring parts, from the gum to the
, or from the cheek to the gum, and implicates at last the whole
f the mouth, or of the lower lip. At the same time the affected
or lip undergoes a circumscribed infiltration, which is at first
r soft, but becomes afterwards firmer, and forms at last a hard
ounded knot or tumor in the centre of the cheek, which is now
, shining as though smeared with oil, and pale, or marbled with
e spots, while the slough on the inside is of a brownish color, more
ded in size, and sometimes surrounded by a dark ring. The hard
r of the cheek just described usually appears between the first
hird days after the sphacelation of the mucous membrane, though
me instances not until a later period. It is formed, as stated in
ccount of the anatomical lesions, by engorgement of the cellular
dipose tissues. The child, at this stage, is still able to sit up in
nd take notice, or shows evident signs of weakness and depres-
the face is swelled and destitute of expression on the affected
a bloody or dark-colored saliva runs from the mouth, which is
ally open; the appetite is not entirely lost in all cases, the patient
demanding and taking food; vomiting is rare, but diarrhœa is
st always present; the thirst is generally intense; the skin is warm
everish, natural, or too cool, and almost always dry, the differences
nding probably more upon the concomitant disease than upon the
h affection. The respiration is natural or altered according to the
re of the primary disease, which is, as already stated, in a large
ortion of the cases, a pulmonary affection. The intelligence is
rally undisturbed, though in some rare cases there is insomnia, de-
m, or piercing cries.

the disease continues to progress, as it almost always does when it
reached the stage we are describing, there appears in many, but
ll the cases (8 of the 21 observed by MM. Rilliet and Barthez), a
gh or eschar upon the most prominent and discolored part of the
ling of the integument of the cheek or lower lip. This generally
es its appearance between the third and sixth days of the disease,
n other cases, as early as the second, or not before the twelfth, or
later. The skin, at the point where the eschar is about to form,
mes purple, and then black; sometimes a phlyctena makes its
arance, which is very soon converted into a small, dry, black slough.
, if not limited by a process of separation from the living tissues,
mes larger and larger by the extension of the sphacelation, until
ay, as already stated, embrace the whole side of the face. In grave
fatal cases, the gangrene sometimes extends to all the tissues of

the cheek, and meeting at last, the disease which had commenced on the inside of the mouth, occasions a perforation, through which may be seen the teeth, alveolar processes, and the whole interior of the buccal cavity. In such instances as these, several of which we have seen in the Pennsylvania and Philadelphia Hospitals, the appearance presented by the child is, as may well be imagined, of the most pitiable kind. Even under these circumstances, however, with the cheek perforated, the edges of the opening irregular and covered with shreds of dead tissue, the gums destroyed, the teeth loosened, and the maxillary bones exposed, blackened, and perhaps necrosed, with a dark and fetid sanies flowing from the mouth or perforation, and a putrefactive smell infecting the air around, the child may retain, in some instances, its strength, so as to sit up in bed, ask for food, and drink with avidity. In other cases, on the contrary, the patient, at this stage, is exhausted to the last degree, and refuses both food and drink. During the closing stage of the disease there is generally profuse diarrhœa, rapid emaciation, dry skin, small, rapid pulse, and at last death in a state of utter prostration.

In favorable cases the recovery may take place in the early stage, before the integument becomes involved, and while the gangrene is limited to the mucous membrane, or at a later period, after the slough has separated. In the first instance the child generally recovers without deformity, though we saw one case in which necrosis of about an inch of the front of the inferior maxilla took place, without any loss of the soft parts. When the child recovers after the formation of the cutaneous slough, a very rare event, the gangrene ceases to extend, the eschar separates and is cast off, the edges of the opening assume the appearances of a healthy ulcer, and after a length of time approach each other and cicatrize, leaving generally a large, uneven, discolored scar, like that of a burn, which remains through life a horrid deformity.

The *duration* of the disease varies according to its termination. When this is unfavorable, which happens in much the larger proportion of cases, death usually occurs about the end of the first, or in the course of the second week, though it has been known to occur at a later period. In favorable cases the duration is commonly longer, particularly if a cutaneous eschar has been produced, as the separation of the slough and cicatrization of the ulcer which remains require a tedious and slow process on the part of nature.

Complications are very apt to arise in the course of the disease. The most frequent is pneumonia. MM. Guersant and Blache state that it exists in nine-tenths of the cases; MM. Rilliet and Barthez found it in 19 out of 21; of the 19, it began in 8 during the progress of the gangrene, and apparently under the influence of the latter, whilst in the remaining cases it existed before, and acted perhaps as a predisposing cause to the affection of the mouth. Another and more dangerous complication is the occurrence of gangrene in other parts of the body, particularly the soft palate, pharynx, œsophagus, anus, and more frequently the vulva and lungs.

ɪxosɪs.—Some authors have described as identical affections, the title of gangrenous stomatitis, the disease under considera- ıd the one already treated of as ulcero-membranous stomatitis. ıas been done particularly by M. Taupin, who is followed in his ption by M. Valleix (*Guide du Méd. Prat.*, t. iv). It seems clear moreover, that Dr. B. H. Coates, in his very valuable paper on ;angrenous sore mouth of children" (*loc. cit.*), mingles in his de- on the two diseases referred to. We cannot but think, however, ıe differences between them as to frequency, symptoms, course, bility to treatment, and termination, which are fully pointed out diagnostic table below, and lastly the example of almost all au- ɪpon this subject, fully warrant us in regarding them as different stinct diseases.

diagnosis of gangrene of the mouth is, in most cases, very easy. lceration of the mucous membrane, followed by gangrene; the ated induration of the cheek, at first pale on the outside, then olored, and terminating after a time in a characteristic slough; urse of the malady, and the nature of the general symptoms, will ılly prevent any difficulty in the recognition of the disease.

m stomatitis it may be distinguished by attention to the points ›wn in the following table, taken from MM. Rilliet and Barthez:

STOMATITIS.	GANGRENE.
ns by ulceration or by pseudo-mem- s plastic deposit.	Begins by ulceration, which is sometimes gangrenous from the first, or by œdema of the cheek.
very fetid and sometimes gangre-	Odor always gangrenous.
ittle extension of the local lesion, always retains the same appear-	Considerable and rapid extension; the tissues assume a peculiar dark grayish tint.
ittle swelling of the cheek or lips, ly œdema of those parts, without ted induration, tension, or unc- ppearance.	Extensive swelling and œdema of the cheek, with deepseated induration, tension, unctuous appearance, purple spots.
ation rarely so considerable as to m the mouth; when present some- sanguinolent; never mixed with of gangrenous tissue.	Salivation abundant; constant escape of fluid, at first sanguinolent, afterwards putrefactive.
r an eschar on the exterior.	Often an eschar upon the cheek or lips.
er complete perforation of the soft denudation of the bones never oc- loss of the teeth very rare.	Perforation of the soft parts frequent; denudation of the bones constant; loosening of the teeth constant, and their loss frequent.
rse of the disease slow when left to recovery rapid under the influence tment.	Course rapid, and termination fatal, as a rule, when the disease is left to itself, and in spite of all treatment.

ıgrene of the mouth may be confounded with malignant pustule. method of diagnosis has been drawn by M. Baron in the following s: "Malignant pustule always begins on the exterior; affects the epidermis first, and extends successively to the corpus mucosum, cl and subjacent parts; whilst on the contrary, the gangrene unde sideration attacks the mucous membrane first, then the muscle lastly the skin."

PROGNOSIS.—The prognosis of true gangrene of the mouth is e ingly unfavorable. The great majority of the subjects die in sp all that can be done. Dr. Coates (*loc. cit.*, p. 14) says that a spot on the outer surface of the swelling "has always been i own experience the immediate harbinger of death. It is pro state, however, that I have heard it said that cases had recover this city, in which the gangrene had produced a hole throug cheek." MM. Rilliet and Barthez state that "death is the ord termination of gangrene of the mouth; though there are instan recovery on record." Of 29 cases analyzed by them, only 3 reco MM. Guersant and Blache (*loc. cit.*, p. 596) state that unless arres the formative stage, it ends fatally almost constantly in from fi ten days, and frequently before perforation has taken place. cases observed by M. Taupin in the Children's Hospital at Pari one escaped (Guersant and Blache, *loc. cit.*, p. 597). The auth the *Compendium de Médecine Pratique* say of this disease (t. i, p. "Death is the almost inevitable termination." Dr. Marshall Hall (*Med. and Surg. Journ.*, xiv, p. 547) reports six cases of the diseas of which followed measles, one repeated attacks of pneumonia fever (type not mentioned), one worm fever, and one typhus All but one, the case occurring in the course of typhus fever, in twelve years old, died. This girl recovered, with, however, falli of the right cheek, "a frightful chasm" on the left side of the m and caries of a portion of the alveolar process, palate bone, and s molar tooth. Recoveries sometimes occur, however, as in the case tioned by Dr. Hall, after perforation, but nearly always with te deformities, with adhesions of the walls of the mouth to the jaws, incurable fistulæ, &c.

The prognosis is more favorable in private practice than in hos The favorable circumstances in any case are: good hygienic condi vigorous constitution of the child; the absence of dangerous concom disease; the continuance of appetite and strength; and a dispositi limitation and separation of the slough. Unfavorable symptoms weak and debilitated constitution of the patient; severe coexisten case; prostration of the strength; and extension of the sloughing cess. Death may also occur from hemorrhage in consequence o separation of the slough, as in a case quoted from Hueter by Bouc

TREATMENT.—The reader need but refer to the remarks on prog to be assured that no treatment as yet discovered promises muc cess. We would call attention also to the following statement,- the remarks about to be made apply only to true gangrene o mouth, and not to all the cases described by some writers unde title of gangrenous sore mouth or even that of gangrene of the m

n, however, that nearly all the patients subjected to cauteriza-
lie, and that of the small number saved, there are as many who
iot been subjected to that treatment, as there are of those to
it had been fully applied. They wonder, therefore, that recent
rs continue to repose the same confidence in it, as did their pre-
sors. "For us," they say, "we are of opinion that cauterization
s but slight influence, if it have any at all, and it is greatly to be
d that the zeal of practitioners might discover some more effica-
remedy" (*loc. cit.*, t. v, p. 551).

s very important to make use of the caustic application as early
the beginning of the sphacelus as possible, for if it be allowed to
d to any considerable depth or extent, there is scarcely a hope of
ting it by any means. MM. Guersant and Blache recommend
nitric, sulphuric, or muriatic acid; MM. Rilliet and Barthez pro-
the acid nitrate of mercury, or muriatic, sulphuric, or acetic acid;
alleix proposes the treatment employed by M. Taupin, which is to
re the pseudo-membrane and a part or the whole of the gangren-
schar with scissors, to make some scarifications upon the healthy
, to apply pure muriatic acid, and after the fall of the slough, to
use of dry cloride of lime (calx chlorinata). The acid most gen-
employed is the muriatic. The local treatment proposed by MM.
t and Barthez is the following: As soon as the ulcerations assume
grenous appearance, to touch them with a brush or sponge dipped
cid nitrate of mercury, or pure muriatic acid, the brush to remain
ntact with the sloughs for a few instants, and then to be applied
ly around and on the parts beyond them. After this cauterization,
plication is to be made of dry chloride of lime (in the manner rec-
ended in the article on ulcero-membranous stomatitis), which is
left in contact with the sloughs for a few minutes, when the mouth
be thoroughly washed with a strong jet of water from a syringe.
cauterization and use of the chloride of lime are to be resorted to

pledgets of charpie, dipped in a solution of soda. This treatment is to be continued until the slough separates, when the edges of the wound, and all the diseased parts that can be reached, are to be cauterized.

In applying escharotics to the mouth, certain general precautions are required, of which it is necessary to give some account. When they are used upon the inside of the cheek, a spoon must be introduced into the mouth, with the concavity directed towards the alveolar processes, in order to preserve the teeth and tongue from being touched. When the application is made upon the gums, the cheek should be drawn to one side by an assistant, and the tongue pushed out of the way with the finger, or a spoon. If the acid happen to touch the teeth or tongue, it must be instantly washed off. The mouth ought always to be thoroughly cleansed with water immediately after the cauterization, to remove any superabundance of acid.

The kind of brush most suitable for the application of the mineral acids is one made of charpie, strongly tied to a solid handle. The sponge-mop, which is sometimes used, is made by fastening a small piece of fine sponge to the end of a stick.

MM. Guersant and Blache recommend that the acid be applied to the slough every hour, until the sphacelus ceases to extend. They state that this plan is sometimes advantageous when the gangrene is confined to the gums only, but that it is generally powerless when the disease has extended to the cheek, or has implicated the deepseated tissues. Under the latter circumstances, and when the inefficacy of caustic has been shown by trial, they propose the use of the actual cautery, as recommended by M. Baron, and other distinguished practitioners, and which, they add, has afforded them some brilliant results in very bad cases.

M. Barrier advises that we should accurately expose the diseased parts by crucial incisions, and apply the escharotic to all the parts forming the limits of the gangrene, in such a way that the tissues already disposed to slough shall be thoroughly cauterized, while those a little beyond are so in a less degree.

In applying these powerful caustics, several authorities recommend the administration of an anæsthetic.

The English writers, and those of our own country, seem rather less disposed than the French to make use of powerful escharotics, and lay more stress upon the general treatment. Underwood, following Dease of Dublin, advises that "the parts should be washed and likewise injected with muriatic acid, in chamomile or sage tea, and afterwards dressed with the acid, mixed with the honey of roses, and over all a carrot poultice." Dr. Symonds (*Lib. of Pract. Med.*, vol. iii, p. 23) directs the cheek to be frequently rubbed with a stimulating embrocation of camphorated oil and ammonia, on the first appearance of the swelling, and in the intervals to be kept moist with a tepid lotion containing muriate of ammonia and alcohol. On the slightest appearance of an eschar upon the interior of the mouth, it is to be touched with

ntrated solution of nitrate of copper, to the sloughing surfaces,
lso paints the circumference of the disease and the surrounding
with collodion, which, he believes, acts favorably upon the capil-
irculation of the part. Dr. Gerhard (*Lib. of Pract. Med.*, vol. iii,
d., p. 24) says, "The best local applications are the nitrate of
, if the slough be small in extent; if much larger, the best eschar-
s the muriated tincture of iron, applied in the undiluted state:
the progress of the disease is arrested, the ulcer will improve
y under an astringent stimulant, such as the tincture of myrrh,
aromatic wine of the French Pharmacopœia." Dr. Dunglison
of Med., vol. i, p. 36) recommends the application with a brush,
mixture of equal parts of creasote and alcohol, after incisions
been made through the gangrenous parts. Dr. Condie (*op. cit.*,
l., p. 174) states that he has found a strong solution of sulphate
pper (thirty grains to the ounce of water), applied very carefully
a day, to the full extent of the gangrenous ulceration, by far
ost successful lotion.

have, ourselves, lately employed carbolic acid in two severe
The pure acid was carefully applied to the sloughing ulcer on
nside of the cheek, and subsequently a solution of one part of
cid in fifty of water, was frequently employed to wash out the
h. The application of the undiluted acid seemed to have a bene-
effect, by checking the progress of the sloughing, and completely
oying the putridity of the dead tissue which had not as yet sepa-
. One of the cases recovered quickly, without perforation of the
; but in the other death occurred, with symptoms of profound
amia, though there was little, if any, extension of the gangrene.

seems to us very clear, after the study of the treatment recom-
led by the different writers quoted above, that the most important
of the local management of the disease is the early application

sulphate of copper, of solutions of nitrate of silver of moderate strength, or of the dressings of muriatic acid and honey of roses, as proposed by Underwood, in connection with carrot and fermenting poultices, as recommended by Underwood and Symonds. Throughout the course of the disease the mouth ought to be frequently cleansed by washing or injecting with solution of chlorinated soda, mixed with eight parts of water, or with a dilute solution of carbolic acid, which corrects at the same time the terrible fetor of the disease.

The importance of these measures can scarcely be overestimated, since the presence of gangrenous tissue about the oral cavity must lead to the introduction of the poisonous results of putrefaction into the system, both by the fetid discharges which partly flow down the œsophagus, and still more by the contamination of the inspired air. Indeed, it seems quite possible, as urged by Dr. Keiller (*Edin. Med. Jour.*, April, 1862), that in cases of unchecked gangrene of the mouth, death occurs, in a great measure, from secondary blood-poisoning, resulting from the continued and unavoidable inhalation of air poisoned by emanations from the gangrenous sloughs. It is evident, therefore, that local applications, both of caustics and antiseptic lotions, must be of great service, by arresting the sloughing and correcting or checking the foul discharges.

General Treatment.—All writers recommend the use of tonics, stimulants, and nutritious diet, unless the presence of high fever, or the state of the digestive organs, seems to contraindicate their employment. From our own personal experience in the treatment of this affection; from a consideration of what we have seen most successful in other forms of gangrene, as that following accidents and surgical operations in deteriorated constitutions; from what proved effectual in a case of idiopathic gangrene of the vulva, in a child ten years of age, which came under our charge; and from what is necessary in that analogous condition of the constitution which accompanies typhoid and cachectic diseases, we are induced to believe that the general treatment must be of at least as great importance as the local, and that the steady and persevering use of tonics, stimulants, and of the most strengthening diet, should always be insisted on from the earliest period, whether fever be present or not. The quantity of stimulants, and the amount of food, ought, it seems to us, to be measured only by the capacity of the digestive organs to receive and assimilate them. Of the tonics, the best are quinine and muriated tincture of iron, which may be given in syrup, in doses of a grain of the former with from three to five drops of the latter, four or five times a day, to a child three or four years old. The most suitable stimulants are very fine old brandy, Madeira wine given in considerable quantities, and, if the stomach is sure to receive it well, carbonate of ammonia, or better still, the aromatic spirit of hartshorn. The diet must consist of milk made into punch with brandy, wine-whey, the yelk of eggs beaten up with wine, strong soups and beef tea, animal jellies, and, if the child wish it, tender meat finely minced.

room in which the child is placed ought to be large, if possible, all events thoroughly ventilated.

ARTICLE V.

THRUSH.

NITION ; SYNONYMS ; FREQUENCY ; FORMS.—Thrush is associated he growth of a peculiar fungus, the *oidium albicans* (Robin), and s as a deposit upon the mucous membrane of the mouth, of a or grayish-yellow exudation, of a soft cheesy consistence, at dherent, and afterwards spontaneously detached, and generally mpanied by ulceration of the tissue beneath. This constitutes ole disease in some cases, no other lesion being discoverable; in other instances, and probably in a large majority, it is con- with some more or less serious general or local disorder. It is ease described under the title of aphthæ or thrush, by Underwood berle; of aphthæ, by Dewees; of erythematic stomatitis, with e exudation, by Dr. Condie; and of aphtha lactantium, aphtha en, and aphtha infantilis, by the older writers. It is the muguet French.

frequency of the disease is very great in hospitals for children. mmon also amongst the children of the poor, and comparatively the middle and upper classes of society. It occurs under two the *idiopathic* or *primary*, and *symptomatic* or *secondary*. By the meant the form in which the affection of the mouth is the only tible lesion; by the second, that in which disease of other organs he constitution generally, precedes the buccal exudation.

SES.—PREDISPOSING CAUSES.—The disease occurs at all *ages*, but far most common during the first two months of life. *Altered* from any cause, *deficient ventilation*, and *want of cleanliness*, ly predispose to the production of thrush. Much difference of n exists as to the nature of the connection between *enteritis* and , especially since the publication of the researches of M. Valleix, hinks that the latter disease is almost always the consequence former, and who doubts the existence of purely local cases of . MM. Trousseau and Delpech, on the contrary (*Journ. de Méd. I. Beau et Trousseau*, January, February, April, May, 1845), re- 4 cases out of 58, in which there was neither gastric nor intesti- mplication, and others in which enteritis did not occur except as equence of thrush. They state, however, that though enteritis ot exist in all cases, and is a simple complication in others, it is mes the true cause, the sole origin of the disease. Again, Dr. in a very accurate and careful history of the disease (*Brit. and*

For. Med. Rev., October, 1847, p. 429), in which he demonstrates its *cryptogamic nature*, states "that both the local and general symptoms which accompany thrush in the child are, in most cases, immediate or secondary consequences of the presence of the parasite, and not to be regarded as the causes of that fungoid vegetation." It is believed by many observers to be *contagious*. This opinion is rendered doubtful, however, by the assertion of MM. Baron, Billard, Guersant, and Valleix (*loc. cit.*, t. iv, p. 63), that they have known children in health to be fed with the same spoon which has been used for others affected with the disease, without their contracting it. M. Bouchut, on the contrary, and Dr. Berg (*loc. cit.*), both of whom believe in the cryptogamic nature of thrush, assert it to be contagious. Dr. Berg is of opinion that it is "conveyed from one patient to another by sporules or fragments of sporules, in the dried state, floating in the atmosphere, but that still more frequently it is propagated by the bottles from which children with thrush have been fed, or by the nipple, especially where, as in many hospitals, two children are suckled by one nurse." This gentleman made many experiments in order to decide this question, all of which proved favorable to the idea of contagion.

Of various predisposing causes which have been cited as productive of the disease, the ones most generally admitted are the use of *artificial diet*, particularly one consisting of farinaceous substances, and, in children who are suckled, an *unhealthy state* of the nurse's milk. To show the truth of these assertions, I make the following quotations. Underwood says: "A principal remote cause of this disease seems to be indigestion, whether produced by bad milk, or other unwholesome food, or by the weakness of the stomach." Dewees remarks that "children fed much upon farinaceous substances are especially exposed to the attacks of this disease, particularly when their food is sweetened with brown sugar or molasses." Dr. Eberle says: "Unwholesome and indigestible nourishment, and overdistension of the stomach, during the early stages of infancy, almost inevitably lead to the occurrence of aphthæ (thrush). Bad and old milk, and thick farinaceous preparations sweetened with brown sugar or molasses, are especially apt to give rise to the disease." Much influence is ascribed by Dr. Berg to the operation of artificial food in favoring the growth of thrush. M. Valleix (*loc. cit.*, p. 60), who has studied the subject with the greatest care and attention, says that amongst the hygienic conditions which may act as predisposing causes "one alone has seemed to me to exert a positive influence, and this is *improper alimentation*." He adds, that since the publication of his *Clinique*, he has several times met with cases of thrush, "and I have always found that the children had been put upon feculent diet. On the other hand, I have never known a child to have the disease, who had been suckled exclusively during the early months of life." MM. Trousseau and Delpech, in the very valuable paper on muguet (thrush), already quoted, say: "We would be justified, therefore, in asserting that we have never known an infant to die of thrush, who had been suckled at a healthy breast, or whose health had not been danger-

ing Causes.—The deprivation of the breast, and a consequent
o artificial diet, particularly one consisting of farinaceous sub-
, is probably much the most frequent exciting cause of thrush.
ealthy state of the milk of the nurse will also act as an exciting
We have met with two cases of the disease, one of them fatal,
appeared to depend upon the latter circumstance. Dr. Berg
that prolonged sleep from any cause disposes to the disease,
ring the growth of the parasite, or by so changing the secre-
the mucous membrane of the mouth, as to render them impor-
ents in augmenting the disorder. An acid state of the buccal
n is cited as a cause by many authors, and is clearly proved to
a great many instances.

OMICAL LESIONS.—The characteristic deposit is found upon the
membrane of the mouth, pharynx, œsophagus, and in rare
f the stomach and intestines. The question of the possibility
extension of thrush to the gastric mucous membrane has been
iscussed, and the highest authorities have been almost equally
upon it. This disagreement has arisen solely from the want
roscopical examination, which enables the observer to distin-
eadily between true thrush and other appearances of the gas-
ucous membrane which closely resemble it. The most conclu-
monstration of its occurrence upon the mucous membrane of the
h has been recently furnished in a valuable article on this sub-
M. J. Parrot (*Arch. de Physiologie Norm. et Path.*, Nos. 4 and 5,
and in a still more recent article (*id. op.*, vol. iii, 1870, p. 621),
also determined the possibility of its development in the large
ne. It is a curious fact, and a very important one, insisted upon
. Trousseau and Delpech, and other observers, that the false
ane never extends to the nasal or air-passages; and they call
on to the singular difference in this respect between the affection

ness and thickening. The authors cited above are of opinion that the gastric lesions have been greatly exaggerated, and assert them to be much the same as exist in other diseases foreign to the digestive apparatus. Various morbid alterations of the mucous membrane of the intestines exist in nearly all fatal cases. This fact is acknowledged as well by MM. Trousseau and Delpech, who deny the invariable connection of these alterations with thrush, as by M. Valleix, who asserts the connection almost without reserve. In nearly all cases the mucous membrane of the large intestine presents some of the following lesions, which are mentioned in the order of their frequency: thickening, injection, softening, or ulceration. In the ileum are found, in a great many cases, injection, softening, or thickening of the mucous membrane, unusual development of the mucous follicles, and tumefaction and ulceration of the glands of Peyer.

In severe symptomatic cases a certain amount of erythematous inflammation is commonly found upon the skin of the buttocks and thighs, and ulcerations sometimes exist upon the inner ankles. Traces of inflammation sometimes, but very rarely, exist in the membranes of the brain, and the lungs not unfrequently present the lesions of secondary pneumonia. Before leaving this part of the subject, we may remark that in the few cases we have met with in private practice, no ulcerations occurred upon the malleoli, and the erythema was observed only in the neighborhood of the anus.

Dr. Dewees describes the autopsy of a child who died about the end of the first month of life, of what he designates as aphthæ. The lesions coincide so closely with those which are characteristic of thrush, that we will quote the description, in order that the two may be compared together by the reader. "We found the whole tract of the œsophagus literally blocked up with an aphthous incrustation, to the cardia, and there it suddenly stopped. The inner coat of the stomach bore some marks of inflammation, as did several portions of the intestines; but not a trace of aphthæ could be discovered below the place just mentioned." In the previous description of the case, he says that coat after coat of aphthæ were thrown off, and each new crop appeared to be more abundant, and less amenable to remedies. (*Dewees on Children*, p. 304–305.)

Dr. Eberle says: "I have myself had an opportunity of examining the body of an infant, that had died of this disease (aphthæ or thrush). In this case the aphthæ were very distinct, throughout the whole course of the œsophagus. The stomach and bowels presented nothing that bore any resemblance to this eruption; but there were decided marks of inflammation in the mucous membrane of the small intestines, with a vast number of minute superficial ulcerations, and larger patches of softening of this tissue, throughout the colon and lower part of the rectum." (*Diseases of Children*, p. 172–173.)

SYMPTOMS.—We shall first describe the characters of the exudation, and then proceed to the consideration of certain general and local

mena which exist to a greater or less extent in both forms of the
se.

e mucous membrane of the mouth is often somewhat red, dry,
ender for a longer or a shorter time (generally from one to three
, before the appearance of the exudation, and at the same time
apillæ of the tongue swell and become protuberant. Next the
tion shows itself in the form of small, whitish points, sometimes
e tongue first, and in other cases on the inside of the lips, whence
ends to the cheeks in idiopathic mild cases, and to the roof of the
h, soft palate, pharynx, and œsophagus, in the grave sympto-
form. The points of false membrane first deposited rapidly in-
e in size and thickness, so that in from one to three or four days,
assume the form of large patches, or a continuous membrane,
covers the whole or a considerable portion of the cavity of the
h. When the exudation is recent, it is thin, and its surface
th; when, on the contrary, it has been longer deposited, it be-
s thicker, and its surface is rough. It is at first of a milk-white or
y hue, but when undisturbed assumes a grayish or yellowish
It is soft in consistence, breaking down under the finger like
e, and presenting no traces of organization to the naked eye. It
es to the mucous membrane with considerable tenacity at first,
ecomes looser after awhile, and is detached spontaneously at last
ut any lesion of the tissue beneath.

e foregoing description applies to the exudation as it appears to
nassisted eye. We pass next to give an account of the characters
esents, when subjected to microscopical examination, and in so
shall quote the language of Berg, who first discovered that thrush
tially depended upon the presence of a peculiar parasitic fungus,
ich Robin has given the name of oidium albicans. Dr. Berg (*loc.*
tates, that the white coating of the exudation consists of epithe-
thickened by the swelling of its constituent cells; from the epithe-
there springs a parasitic fungus in greater or less quantity, so
the chief portion of a patch of aphthæ (thrush) is composed either
ithelium or else of the parasitic growth. Under a magnifying power
om 200 to 300 diameters, an aphthous crust is seen to consist of
elial cells, with a more or less interwoven coat of fibres, and a
ble number of spherical or oval cells, without any sign of exuda-
orpuscles, but only a small quantity of molecular albuminous de-
. "We can often trace the successive development of these cells
a spherical one of the smallest size, to an oval cell, and thence to a
ent; and we have no doubt ourselves that the smaller cells are
les, out of whose development the larger oval cells are formed,
finally, the filaments in the same manner as has been observed in
fungoid growths of this nature." Numerous projecting fibrils
bserved in the circumference of an aphthous crust when sub-
d to the microscope; but these are rendered infinitely more clear
weak solution of potash, which dissolves the albumen, and renders
ells of the epithelium transparent, while, at the same time, it

diminishes their intimate cohesion, and the network of vegetable fibres is more plainly seen. "These fibres are cylindrical, with sharply defined dark edges, and their centres are transparent in transmitted light; they are generally equal in thickness, but at times they are, as it were, knotted together, and divided by distinct walls of separation. . . . . In their interior, these fibrils often exhibit nucleated cells; occasionally these are very numerous, and of small size, but at times they are larger. In their course the fibrils divide into numerous branches, whose diameter is not less than that of the original stem, and I have occasionally observed these ramifications to increase in thickness, at their free extremity, and to terminate in a club-shaped end with a species of cell. From the sides of the fibrils spring numerous sporules, forming a point of departure for new ramifications. . . . . Careful investigation has shown us that these cells are placed upon the sides of the fibrils, and in particular that they are congregated around the terminations of the latter. It must, therefore, be admitted that the cells and the fibrils are both constituent parts of one and the same organization. When this growth vegetates undisturbed, its fibrils penetrate between the layers of the epithelial cells, but do not extend deeper than the inferior layer, though they spread laterally in every direction. On the free surface of the epithelium, the ramifications rise above the surface, exhibiting at the same time an abundant fructification, which gives a yellowish hue to the exterior."

M. Parrot, in describing the appearances of thrush upon the gastric mucous membrane, states that the disease presented itself in the form of small prominent rounded masses, of yellowish color, and either isolated or in groups. These were adherent to the mucous membrane, nearly all umbilicated, and upon pressure the central depression became filled with a cheesy-looking material. On microscopic examinations of sections, the spores and filaments of the muguet were found infiltrating the tissue, and as it were planted there, at times scattered in small numbers, at others accumulated in large masses, and holding between them many oil-drops and some débris of the mucous membrane. The muscular coat of the stomach was not involved, but in some instances the spores and filaments penetrated the mucous membrane, and extended to the submucous space. In other cases the mucous membrane was only superficially involved.

The reader is referred for a more full account of the cryptogamic theory of thrush to the interesting review of Berg's work above quoted, and to Bouchut's work on the diseases of new-born children; and for a complete description of the oidium albicans to the work of Robin, *Histoire Naturelle des Végétaux Parasites*, Paris, 1853; the articles of Parrot above quoted; and the article on Thrush in Vogel's work on the *Diseases of Children* (Amer. ed., 1870, p. 99).

Symptoms of the Mild Form of Thrush.—This form is the one most frequently met with in private practice. It is mild in all its characters, and often presents no other symptoms than those connected with the mouth. These are *heat* and *dryness*, with *tenderness* of that part. The

rness is shown by the child's crying and jerking the head back-
s when the finger is introduced into the mouth, whereas, in health,
nfant will almost always seize the finger and suck it with consid-
e force. It is shown, also, by the refusal to take the breast, or by
ifficulty with which this is done, the child occasionally letting the
e drop with a cry of pain, then seizing it again, and again drop-
it with fretting or screaming. In some of the cases there are va-
signs of disorder of the digestive tube, which are, however, seldom
e. They consist of slight diarrhœa, the stools being at first yellow,
fterwards green and acid; of occasional vomiting, of attacks of
y pain, and sometimes of feverishness. To show how frequent
occurrence of diarrhœa in thrush, and to prove also that it is not
essary accompaniment of the disease, as has been supposed by
persons, we will quote the fact mentioned by Dr. Berg, that of 115
, in only 29 did the stools retain the normal yellow color through-
he whole course of the disease; while in the remaining 86, green
ations appeared simultaneously with the invasion, or supervened
ater period. We may cite also the cases reported by MM. Trous-
and Delpech, of which only 14 out of 58 presented neither gastric
ntestinal complications.

e amount of exudation is generally small in this form, and it rarely
ds behind the soft palate. The *duration* is usually between four
ineteen days, the average being about eight or twelve. The ter-
tion is almost always favorable.

ave Form.—It is under this form that the disease is most apt to
r in public institutions for children, and particularly in foundling
itals. That it sometimes occurs, also, in private practice, will not
oubted, we think, by any who will read with care the descriptions
he disease given by Underwood, Dewees, and Eberle. We have
lves met with two fatal cases in private practice, which presented
he symptoms described by M. Valleix as characterizing those ob-
ed by him in the Foundling's Hospital at Paris, with the single ex-
on of the ulcerations upon the internal malleoli. They were both
ren of parents who had every comfort at their command. One
at the age of four weeks, in consequence of the attempt to rear it
rtificial diet. The other perished when six weeks old, apparently
some unhealthy condition of the mother's milk, which seems the
probable from the fact that the same mother had previously lost
children under precisely similar circumstances; all the children of
person were born vigorous and hearty, and did well for a short
, but soon after the birth, the nipples of the mother became dread-
excoriated, the digestive organs of the infant began to give way,
death finally occurred with all the symptoms of fully developed
sh. We can surmise now, though no examination was made at the
, that the cause of the disease was a continuance of colostrum-cor-
les in the mother's milk.

e most important *symptoms* of the grave form are the buccal *exu-*
n, various *abdominal* symptoms, particularly diarrhœa, vomiting,

and colic, and more or less marked *fever*. The order of succession of the symptoms in severe thrush is not always the same. In most of the cases the first symptom observed is, probably, diarrhœa, which is soon followed by fever, and in a few days by the appearance of the false membrane in the mouth. In a smaller number of instances the buccal exudation is the first symptom observed. The characters of the exudation are much the same as those observed in the mild form of the disease, except that the membrane is thicker, covers a larger portion of the mouth, and generally extends to the pharynx and œsophagus. In addition to the plastic deposit, there sometimes exist, especially in very bad cases, ulcerations upon the roof of the mouth, frænum linguæ, and gums. These are generally few in number, and either confined to the mucous tissue, or they may extend to the fibrous texture beneath; the surface upon which they rest is generally softened in consistence; their edges are irregular, soft, and of a whitish or reddish color. The heat of the mouth is not generally increased, except in very severe cases; the mouth is moist at first, but afterwards becomes very dry, and, from the refusal to suck the finger when it is introduced between the lips, and the difficulty with which the acts of suckling or feeding are performed, is evidently tender and painful.

The symptoms depending on the enteritic affection, are *tenderness* of the abdomen, *diarrhœa*, *vomiting*, and *fever*. The abdomen is usually distended by flatulent collections in the bowels, and is more or less painful to the touch, particularly in the right iliac fossa and epigastrium, and in severe cases over its whole extent. At the same time the child evidently suffers from colicky pains, as shown by restlessness, by uneasy, twisting movements of the trunk, by kicking of the limbs, and by crying, particularly just before or at the moment of the evacuations. The appetite is usually diminished or entirely lost. The diarrhœa comes on gradually, the stools retaining their natural color at first, and being merely thinner and more frequent than natural. As the case progresses, they become more and more liquid and numerous, and almost invariably of a bright green color, and very acid. The green color of the discharges, and their highly acid condition, is noticed by all observers. *Vomiting* occurs in many of the cases, but is less frequent than diarrhœa. In some instances it is very obstinate and distressing, causing the rejection of whatever alimentary substances the child may take. Under these circumstances it has often been observed to coincide with the presence of a great deal of exudation upon the base of the tongue and soft palate, which has been supposed to act as its exciting cause. In other instances it is not so frequent, and as the matters ejected consist of greenish or yellowish bile, while, at the same time, the epigastrium is very sensible to pressure, this form of vomiting has been thought to depend upon gastritis.

Fever exists in most cases, from the time that diarrhœa makes its appearance, and sometimes at an earlier period. It is at first moderate, but as the case goes on, often becomes intense, the pulse rising gradually from 80 to 90, or 120, 140, and even 160. The *heat* of the surface, especially of the abdomen, is much increased, and accompanied by dryness. The feverish condition of the system is shown also by the restlessness and fretting of the child, and often by loud, frequent crying. When the exudation extends into the pharynx, the cry usually becomes hoarse and indistinct.

There are two other symptoms which occur in the course of thrush, about which some discussion has arisen. These are, the appearance of an *erythematous redness* about the anus, and upon the buttocks, genitals, and upper parts of the thighs, and *ulcerations* upon the internal malleoli. The erythema is stated by M. Valleix to precede the other symptoms in the greater number of instances, whilst MM. Trousseau and Delpech deny the correctness of the assertion, and observed it to follow the diarrhœa in the majority of their cases. It seems to us that the latter authors are correct in ascribing the erythema to the irritation produced by the contact of the urine with the skin, which is predisposed, by the cachectic state of the constitution, to take on inflammation from causes which would not affect it in a healthy subject. The erythema is sometimes followed by papules, vesicles, blebs, and ulcerations, all of which probably depend upon the cause just referred to. The malleolar ulcerations are ascribed to the friction of the ankles against each other, a cause sufficient to produce such an effect in a broken-down, diseased constitution, though insufficient in a healthy one. We may mention that we have seen the erythema frequently in private practice, but never the malleolar ulcerations.

During the acute period of the disease, the *strength* of the child is not much diminished, but as the case approaches its termination, if no favorable change takes place, the patient becomes weak and exhausted; the face assumes a pale and sallow look; the features are sharp and defined, and the eyes dull and surrounded by bluish circles. At the same time the whole body becomes emaciated, the skin loses its elasticity, and hangs in folds or wrinkles upon the limbs, and the surface assumes a dark and dingy hue. As the fatal termination approaches, all restlessness ceases, and the child lies profoundly still, or only moves the mouth from time to time, or utters a faint cry; the diarrhœa diminishes, and the vomiting generally ceases; the pulse becomes very rapid and weak, the extremities cold, and death occurs in the midst of profound quiet, or after a few slight convulsive movements. The *duration* of this form of the disease is very uncertain. It is often less than that of the mild form, since many children die in the first five days after the appearance of the exudation. In other cases it is much longer, from a few weeks to two months. Relapses are not uncommon.

Before closing our remarks upon the symptoms, it is proper to state that the disease sometimes occurs at the termination of acute local affections, as pneumonia, bronchitis, or pleurisy, under which circumstances there will be, in addition to the symptoms peculiar to thrush, those of the malady which preceded it.

NATURE OF THE DISEASE.—Repeated microscopic examinations have so uniformly confirmed the statements of Gruby and Berg, that it is

no longer doubtful that a peculiar parasite, oidium albicans, is a
stant element in the exudation of thrush. It is, however, far f
being so well determined what relation this growth bears to the
ease; since, while one class of authorities consider it the essential
sole cause of the other local and general symptoms, another regar
merely as an epiphenomenon, the spores of the parasite finding a s
able nidus for development on the already diseased mucous membra
Fortunately, the solution of this question is of no very great pract
importance, as the causes of the disease are well ascertained, and
prophylactic and curative treatment will not be affected by the v
entertained.

Diagnosis.—The diagnosis of thrush is rarely difficult. Aph
differ from it in their vesicular nature during the formative stag
the ulcerations which follow the vesicles, and in the absence of f
membranes. From ulcero-membranous stomatitis it may be dis
guished, by the formation in that disease of false membrane in la
from the beginning; by the presence of ulcerations; by the spo
bleeding state of the gums; by the fetid breath; by the absence of
abdominal symptoms which exist in thrush; and by the microsc
appearances of the deposit.

Prognosis.—The prognosis must depend, in great measure, upon
circumstances under which the disease occurs. In private prac
and whenever the patients are suckled by their own mothers, or
healthy nurses, it is a mild affection. But in foundling hospitals
the contrary, where the children are mostly brought up by hand,
one of the most fatal maladies to which children are subject.
prognosis varies according to the form of the disease. The mild f
is rarely fatal, while the grave form is fatal in the great majorit
the cases.

To show the frightful severity of the disease under certain circ
stances, we may mention that of 140 cases which occurred in
wards of M. Baron, at the Foundling's Hospital of Paris, only
recovered; while of 22 cases observed by M. Valleix, in the same
pital, but 2 recovered (Valleix, *loc. cit.*, p. 74). Again, M. Bouc
states that of 42 cases observed by himself, at the Necker Hospital
were of the idiopathic (mild) form, all of which terminated favora
and 28 of the grave or symptomatic form, of which 20 died, and 8
the hospital still laboring under the disease. Of the 20 fatal cases
presented the lesions of chronic entero-colitis, 4 of acute entero-col
8 of pneumonia, and 1 of hydrocephalus. It may be stated, in con
sion, that the danger is greatest, in private practice, when the att
occurs in a child fed on artificial diet; when there is reason to sus
an unhealthy state of the nurse's milk; and in proportion to the ext
and quantity of the exudation, its resistance to treatment, and
severity and obstinacy of the abdominal symptoms.

Treatment.—*Prophylactic Treatment*—The most certain mean
preventing thrush are evidently to procure for the child a full, hea
breast of milk, to give it a good habitation, to secure for it per

child than upon any therapeutical system that can be devised. ›st frequent cause of the disease is, as we have seen, artificial pecially one in which milk is sparingly used or excluded, or an thy state of the nurse's milk. It is reasonable to conclude, re, that attention to the removal or mitigation of these and nfavorable hygienic conditions, constitutes the most important ion of treatment.

child who has been attacked with thrush is suckled exclusively, k of the nurse ought to be subjected to chemical and microscopic ation; and should it be found to present unhealthy characters, r nurse ought to be procured as soon as possible. In all such he nurse must pay strict attention to her diet, avoiding all arti- ich she knows or suspects to disagree with her, and all very hes. Dewees recommends that she should abstain from most n vegetables, except rice, and from all kinds of liquors, especi- fermented.

n the disease occurs in a child who is nursed and fed alternately, remark about to be made applies still more appropriately to entirely upon artificial diet, the most important remedy in the to procure a good wet-nurse. This is far better than any med- atment that can be instituted. Often, however, this is impos- nd, under such circumstances, the regulation of the diet ought ttended to with the utmost care by the physician himself, who specify its material, quantity, and mode of preparation.

ve shall be obliged constantly to refer to the proper diet for children in our future articles on diseases of the digestive organs, deed all through this work, we think it will be best to make eneral and extended remarks on the subject here, where we first vith a disease the cause of which is almost always improper nd the cure of which is the abandonment of a faulty, and the ation of a proper aliment.

infant must be wholly or in part fed artificially, and here we ha recommend some substitute for breast-milk. In this city, ass's which is conceded to be more like human milk than that of any animal, cannot be had, and we are forced to take cow's or goat's The latter is not so common as to be readily obtained, and practi we are driven to the use of the former.

In choosing cow's milk, the first thing to be thought of is the p of the milk. In small towns and in the country it is very easy t tain fresh pure milk, but in large cities it is often very difficult. with due care and diligence, and money, it can generally be Our own practice has always been to choose a milkman who hi brings milk from a farm, or who, at least, employs himself the who delivers it. We never have, and never shall, so long as w help ourselves, take milk from those middlemen who buy it of any that may have it to sell. Moreover, the person who has charge o child should always, if possible, know the milkman personally know exactly where he comes from, and what manner of man he be. An *honest* farmer or dairyman who pastures and feeds his cows on a healthy farm is the man to be employed to furnish mi the poor little baby who has to seek another dairy than his mother's. If the character of the milkman is not a sufficient gu tee, or if, from any accident, the milk has to be changed, or i doubt arises as to its quality, there are some simple methods of ing which can be made use of by any person of ordinary intellig and which will reveal any gross deception on the part of the vender.

A good specimen of cow's milk ought to be slightly acid or ne it should contain a certain average proportion of cream, and it s have a certain average density.

These points may be ascertained with sufficient accuracy to gui in our choice or refusal of any sample of milk, in the following n Litmus-paper turns red when touched by any acid; a very weak will do this. If a good specimen of litmus-paper (which can be cured of the apothecary) turns faintly red when dipped into mil milk is properly acid; if turned bright red, the milk is too acid. no change is produced on the litmus-paper, the milk is either ne (which is sometimes the case with healthy milk), or it is alkaline. determine whether it be neutral, turmeric-paper, which is turned b by alkaline solutions, must be used. If the specimen is found alkaline in a marked degree, either the cow is diseased in all p bility, or some alkali has been added to the milk.

It is a curious fact that Dr. Parkes (*Manual of Practical Hygie* ed., London, 1866) is almost alone in asserting that healthy cow's is either faintly acid or neutral. Most authorities assert that it kaline. In order to determine this matter for ourselves, we teste milk of thirty-one fine cows, fed on the finest pasturage in the borhood of this city. This was done by taking the milk, just as wn from each animal, separately in the milking-house, and testing once with the best litmus-paper. In all the paper was turned red re or less distinctly. Dr. John Ashhurst, of this city, tested for us, th both litmus- and turmeric-paper, the milk of nine fine Durham d of four Alderney cows, belonging to his father, all on the finest sturage. He says that in one Durham and in one Alderney the milk ppears to have been almost neutral, and in all the rest more or less cid. In testing the milk of another Durham, litmus-paper was reddened, whilst the turmeric was also slightly changed, but he supposed the latter change to be due to a greasy condition of the milk, owing to the fact that the cow was in the latter period of a long lactation.

To determine the proportion of cream, we may make use of a glass vessel, made of a section of a cylinder, tall, and not too wide, and graduated to inches, with the upper inch divided into hundredths, or a French glass divided into centimetres, such as may be found in the shops for the sale of chemical apparatus. This is to be filled to the upper mark with milk, and put aside for twenty-four hours; at the end of that time the cream will have separated and risen to the top, and its proportion can be read off on the graduated scale. According to Dr. Parkes, the cream should be from 4 to 6 per cent. In the milk of Alderney cows, it will reach 30 to 40 per cent. This seems to us too large a proportion for the use of children.

We think, however, that the average of cream given by Dr. Parkes is probably rather too low. The *Maison Rustique*, a French work of very high authority on agriculture, states (tome iii, p. 61) that the milk of cows, of good race, well kept, furnishes 15 per cent. of cream. The milk supplied by the milkman employed by one of us gave 14 per cent. of cream on one occasion, and 10 at another. The specific gravity of the former specimen was found to be 1029. Of three other specimens, bought at hazard, of different dealers, the proportion of cream was 7 per cent., 6 per cent., and 14 per cent., respectively. We are disposed to think, therefore, that families ought to endeavor to procure milk containing at least 10 per cent. of cream.

We next have to ascertain the density, in order to determine the proportion of water. The most common adulteration of milk is, of course, with water, to increase its quantity, and so augment the profits of the salesman. The density or specific gravity, let it be remembered, is no safe guide as to the proportion of cream. That must be settled in the mode just described. But the density gives the proportion of water. The specific gravity of good, pure milk is given by Dr. Parkes at 1030.5, or 1026, at a temperature of 60° Fahr. We found it in an excellent specimen to be 1029. Dr. Parkes found that when, in milk of the specific gravity above mentioned, one part of water was added to nine of milk, the specific gravity fell to 1027 or 1023; when three parts of water were added to seven of milk, it fell to 1021 or 1017.5; and when five parts of water to five of milk, it fell to 1015. These were the proportions obtained by several experiments.

We found that the specific gravity of a specimen of excellent milk, as ascertained by a hydrometer, was 1028. When to this milk was added one-fourth part of water, the specific gravity fell to 1024, and when a half had been added it fell to 1020. In another specimen, the specific gravity, obtained in the same way, was 1030 at a temperature of 64° Fahr. When to this specimen one-half water was added, the specific gravity fell to 1020.

By these three simple methods of examination, the acidity or alkalinity of the milk, the proportion of cream, and the proportion of water, can be determined. If the milk is either strongly acid or alkaline, it is not to be trusted. If it be strongly acid, it has undergone the acid fermentation, and is not fit for use. If it be strongly alkaline, it has either been adulterated by the addition of an alkali, probably, according to Dr. Parkes, carbonate of soda, to prevent or arrest the lactic acid fermentation, or it may have been taken from a diseased cow. Dr. Parkes suggests the latter probability in a doubtful way. Dr. J. F. Simon, of Berlin (*Animal Chemistry with Reference to the Physiology and Pathology of Man*, vol. ii, p. 67), states, that he analyzed milk drawn from the teat of a cow having vaccinia, and found it strongly alkaline, and showing with the microscope mucus- and pus-corpuscles, while that drawn from a healthy teat had a mild acid reaction, and contained no pus- or mucus-corpuscles. He also states (page 68), that Herberger has analyzed the milk of cows suffering from the grease, and found it to contain an increased quantity of the alkaline salts, in the first stage; in the second stage it was thick and viscid, and had, besides, an unpleasant and putrid taste and smell. In both stages, the presence of carbonate of ammonia (an ingredient never before observed in the milk) was detected.

The most common adulteration of milk is with water. The mode of detecting this, by ascertaining the specific gravity, has already been given. Starch is sometimes used to thicken a thin milk. The microscope will detect this by showing the presence of the starch-granules.

The mother will often wish to preserve milk, especially in our hot summer weather, or for a few days, when on a journey. The best preservative in hot weather, for the day, is of course a good ice-chest. Dr. Parkes says that when boiled, "the bottle quite filled, and at once corked up and well sealed, the milk lessens in bulk, and a vacuum is formed above. It will keep thus for some time. A little sugar aids the preservation. If the heat is carried in a close vessel to 250° Fahr., the milk is preserved for a very long time, even for years; the butter may separate, but this is of no consequence;" or, if a little carbonate of soda and sugar is added, without boiling, he says it will keep for ten days or a fortnight. Cooley, in his *Cyclopædia of Practical Receipts*, states, that the addition of ten to twelve grains of carbonate, or bicarbonate of soda, to each pint of milk, will preserve it for eight or ten days in temperate weather, and adds that this addition is harmless, and, indeed, is advantageous to dyspeptic patients. The method of boiling, proposed by Dr. Parkes, is the one now so much used for preserving fruits fresh.

Having determined upon the use of cow's milk, we have next to con-der its mode of preparation.

It should never be given pure to young infants, at least such is our clear conviction. We still believe that the old rule, of two parts of water to one of milk, is the proper one during the first month. We know that some of the more recent writers, and not a few of the physicians of this city, now order half water and half milk, and some children do well on that proportion; but we still believe that when the milk is of full average richness (containing ten or fifteen per cent. of cream, and having a specific gravity of 1028 to 1030), the old rule of two-thirds water is safest. And this is certainly true of all sickly children within the month. It is easy to increase the proportion afterwards, if the child does not develop as it ought; but the stomach once seriously deranged and overloaded by too rich a food, a severe and even a lingering illness may be the penalty the child will have to suffer.

When the child comes to be one or two months of age, the proportion may be increased to one-half, with care; always, however, returning to the first rule, should the child exhibit signs of gastric disturbance, or should the stools contain many whitish lumps, consisting of undigested casein. At the age of five or six months the proportion may be made two-thirds milk, and thus, gradually, the milk may be given pure, though we have seen many children who, even at a year of age, did better with a moderate dilution than with the pure fluid.

The *quantity* of food to be given each day is a very important consideration, and one about which less is usually said than the matter deserves. In the first edition of this work, published in 1848, it was stated that, from various inquiries and observations, we were lead to believe that a healthy infant of two or three weeks old, would receive, from a good nurse, and digest well, about a pint of food in twenty-four hours, and that by the end of the first, and in the second month, the quantity taken by the child increased to a pint and a half or a quart. Some of the data upon which these assertions were based were the following: A woman, attended in her confinement by one of us, had a pint of milk drawn, by the nurse, daily from the breasts, in addition to what the child took. On asking the nurse how much she supposed the child—a vigorous, hearty boy—took at the same time, her reply was that, judging from the frequency and vigor with which he nursed, she supposed he took as much as was drawn from the breasts. Another patient lost her child at birth, and desiring to go out as a wet-nurse, kept up the flow of her milk by using a puppy. Six weeks after her confinement, a good breast-pump was given her, and she was desired to keep all the milk she could obtain in twenty-four hours. The quantity measured exactly a quart.

It was also stated, in that edition, that careful inquiries were made, in regard to this matter, of one of the most experienced and intelligent monthly nurses we ever knew. She was desired to answer accurately the two following questions:

1. How much milk do you think a healthy mother gives to her child daily, after the flow is fairly established?

2. What quantity of nourishment do you give in twenty-four hours to infants you are compelled to feed exclusively?

The reply to the first question was that she had often drawn more than a pint from the breasts in the twenty-four hours, in addition to what a healthy child took, and that she had frequently taken as much as three pints from women who had lost their children. She supposed, therefore, that a hearty child would take, during the first two weeks, at least a pint, and much more afterwards.

To the second question she replied, that she usually gave to hearty children of one, two, and three weeks old, a pint of food in twenty-four hours.

It was stated in the first edition of this work, that, judging from the above data, a young infant ought to take at least a pint of nourishment in the twenty-four hours. Our experience, since that time, has convinced us that, if anything, this estimate is rather too low than too high. Now we should say that, in the first ten days after birth, a pint or a little over is about the right quantity. After that period a pint and a half to a quart is probably the proper amount up to the second month. In the second and third months many children require a full quart, and some three pints; though, after all, we must be ruled very much by the instinctive wants of the individual child. When fed at regular intervals, upon food of the proper strength, we do not think children often take more than they need.

In the first month the child ought to be fed every two hours, if it takes the food well. After the first month, once in three hours, is usually the best rule. Feeding the child once in three hours, between six in the morning and six in the evening, and twice in the night, would give six meals in the twenty-four hours. If six ounces (a gill and a half) be given each time, the child would get thirty-six ounces, which is a little over a quart. As the age increases, eight ounces may be given every four hours, which would make a quart and a half; and we have met with very few children who exceed this, particularly as by this time the food consists of two-thirds or three-fourths milk, or even pure milk. It may seem needless to add that, unless the child is taking decidedly less than the average stated above, it ought not to be in any degree forced or enticed to swallow more than it takes willingly. The moment it has had enough, the nurse ought to cease to offer any more.

As this matter of the quantity of artificial food necessary for the development of the child is a very important one, and as it is a point which has not been very clearly defined by most writers, we have thought it well to lay before our readers the following calculation of what infants may need, from the estimate made by Dr. Parkes as to the amount of food necessary for adults.

According to that author, an adult of average size and activity will, under conditions of moderate exertion, take in twenty-four hours from $\frac{1}{26}$th to $\frac{1}{20}$th of his own weight in solid and liquid food. The relative ortion of the so-called solid and liquid food varies greatly, but is lly about 40 oz. avoirdupois of the former, and 60 oz. of water. however, all the so-called solid food—bread, meat, &c.—contains a ain amount of water, the actual average amount of water-free food en by an adult, weighing 150 lbs., is 23 oz., or $\frac{1}{105}$th of the weight he body; and the amount of water about 75 oz. Or, in other words, ry pound weight of the body receives about 0.15 oz. of water-free d and 0.5 oz. of water in twenty-four hours. This water-free food omposed as follows, according to Moleschott:

	oz. avoirdupois = 437.5 gr.
Albuminous substances, ...	4.587
Fatty "	2.964
Carbo-hydrates, ...	14.257
Salts (of all kinds), ...	1.058
	22.866

On the basis of these calculations, an infant at birth, the average weight being 7 lbs., would require 1.05 oz. of water-free food; and a child weighing 20 lbs., which is probably the average weight of healthy children of five to six months old, would require 3 oz.

Assuming the total solid of cow's milk to be 10 per cent., which is rather less than the average as given by Becquerel and Rodier (see composition of healthy milk), it would require to yield an ounce of water-free food rather more than 10 ounces of milk.

Thus on this supposition (*i. e.*, that the total solids of cow's milk of sp. gr. 1026, equal 10 per cent.) one pint imperial (20 oz.) will contain in round numbers,

Casein, .	262	grains.
Fats, . .	217	"
Lactin, .	341	"
Salts, . .	43	"
Total, . .	863	" = very nearly 2 oz. avoirdupois of water-free food.

According to this, therefore, the infant at birth requires little more than ½ pint imperial of unskimmed cow's milk; the child at five or six months about 1½ pints imperial.

It is evident that the proportion of fat and water is in great excess in this exclusively milk diet; but these two principles are required in early infancy in much larger relative amount than at a later period of life. It will also be seen that by diluting the above amounts of cow's milk with one to two parts of water, we obtain, as the proper amount of food for new-born infants, from a pint to a pint and a half; and for children about five or six months old, from 3 to 4 pints, amounts which correspond closely with the results obtained from examination of the quantity of milk secreted by nursing women.

Some authorities recommend the regular use of lime-water, instead of simple water, for the purposes of dilution. We ourselves have not

been in the habit of using it, except when the rejection of the mil
hard and large curds, or the frequent appearance in the stools of s
whitish lumps of undigested casein, showed a too early and too g
coagulation of the milk in the stomach. In such cases we always di
lime-water to be added to each meal. As to the quantity of this alk
we will state that Dr. Eustace Smith (*Wasting Diseases of Child*
London, 1868, p. 33), directs, during the first six weeks of life, t
half lime-water and half milk be used. Dr. Routh (*Infant Feeding*,
ed., London, p. 397) advises that from an ounce to an ounce and a l
of lime-water be added to each pint of food. The latter is about
proportion we use. In many cases, however, our patients do perfe
well without any.

Besides the dilution with water, sugar must always be added. Fo
erly, the best lump white sugar was always used. Brown sugar
been found not to answer well. Of late, experience has shown t
sugar of milk, which is the natural sugar found in this fluid, is pre
able to cane sugar. The amount of sugar of milk to be added sho
always be specified by the physician, and not left to the hap-haz
judgment of the nurse or mother, as most persons use too much.
drachm and a half, or about a heaped teaspoonful, is the proper
portion for each eight ounces of food.

Many different and more or less complicated preparations of f
have been recommended by different authorities. We do not th
that any of the various feculent substances, so much vaunted and
vertised for the use of the public, are of any value in the e
months, as compared with milk. Milk must be the basis. It is
really important part of the nutriment. It matters not greatly w
be the feculent substance used, we think, if only the milk be g
and in sufficient quantity, and the feculent material be in small pro
tion. To depend on amylaceous food is usually to sicken, and fin
to starve the child. And yet we have found by experience that a s
quantity of amylaceous material combined with the milk does ren
the food more digestible. We think that the opinion held by sev
physicians, that the particles of starch lessen the tendency of co
milk to coagulate into hard large masses, by being interposed betw
the elements of the casein, may be the correct one. At all events,
perience, as stated above, has led us into the habit of using a s
quantity. The following preparation was published in our first edit
and we have employed it in a great many instances, and have fo
it the best substitute, as a rule, for the natural aliment, that we
acquainted with.

It is made by dissolving a small quantity of prepared gelatin
Russian isinglass in water, to which is added milk, cream, and a l
arrowroot, or any other farinaceous substance that may be prefer
The mode of preparation and the proportions are as follows: A scr
of gelatin (or a piece two inches square of the flat cake in which
sold) is soaked for a short time in cold water, and then boiled in ha
pint of water until it dissolves,—about ten or fifteen minutes. To

l, with constant stirring, and just at the termination of the
the milk and arrowroot, the latter being previously mixed into
with a little cold water. After the addition of the milk and
ot, and just before the removal from the fire, the cream is poured
a moderate quantity of loaf sugar added. The proportions of
eam, and arrowroot must depend on the age and digestive power
child. For a healthy infant within the month, we usually
rom three to four ounces of milk, half an ounce to an ounce
m, and a teaspoonful of arrowroot to a half pint of water.
ler children, the quantity of milk and cream should be gradually
ed to a half or two-thirds milk, and from one to two ounces
am. We seldom increase the quantity of gelatin or arrow-

have given this food to a great many children during the last
-five years, as well to those brought up entirely by hand, as those
suckled, or weaned, and can truly state that they have thriven
upon it than upon anything else we have employed. In several
t has agreed perfectly well with infants who could not, without
ng, diarrhœa, and colic, take plain milk and water, cream and
any kind of farinaceous food prepared with water, chicken
or in fact any other food that had been tried. In the cases of
ildren, it ought sometimes to be made even weaker for awhile
n the proportions first mentioned above.

have been pleased to find that Dr. Routh (*loc. cit.*, p. 315) quotes,
reat approval, a food recommended by Dr. Merei for feeble chil-
with bowels previously deranged, which is almost exactly the
as the above. Dr. Merei is one of the physicians of the Clinical
tal for the Diseases of Children, in Manchester, and one who
herefore, have had a large experience. He first makes a decoc-
f arrowroot with a teaspoonful of arrowroot to three-quarters of
of water, this quantity to serve for a whole day's supply. It is
by Dr. Routh, that the arrowroot is not given as an aliment, but
ftish substance, to soothe mechanically the irritation of the in-
al mucous membrane. "Langenbeck, indeed," he says, "believes
n such cases the granules of starch intersperse themselves between
rticles of casein, and thus in great measure prevent the formation
d, indigestible curds." The mixture Dr. Merei gives, is stated to
t of three or four parts of this thin decoction of arrowroot, to one
f new milk, slightly boiled; and to the twenty-four hours' amount
d thus prepared, he adds about one or two tablespoonfuls of *cream*.
ren, it is further stated, will digest well from a pint to a pint and
of this mixture in twenty-four hours, according to their age.
ey grow older, he increases the proportion of milk, but not of
.

s is so much like our own preparation, recommended twenty-five
ago, that we feel strengthened in our own conviction as to its
, particularly as the two experiences have occurred so far apart as

England and America, and to persons who have reached the resul experience as well as theory.

There are other preparations, such as those of Dr. Frankland Mr. Lobb, which may do well in some cases, but they are so com and require so much time, as to render them almost useless in the sery. The one recommended by Baron Liebig, called Liebig's food have used occasionally, but have been disappointed in its action; an likewise, is so difficult of preparation, that we doubt its coming general use in the nursery, where a food, to be well and properly pared, must be simple.

The causes which compel us to resort to artificial food for young dren, are, of course, very numerous. Thus, it may be impossible, a the death of the mother, to secure a reliable wet-nurse; or the moth supply of milk may be manifestly insufficient; or again, although quantity is abundant, the milk either disagrees with the child, and ca vomiting and diarrhœa, or does not nourish it properly. In every c therefore, where we have reason to suspect that the mother's mil of improper quality, we should subject it to a careful examination; it is needless to add, that whenever a wet-nurse is chosen, a sim examination of her milk should invariably be made.

According to Vernois and Becquerel, who examined the milk eighty-one nursing women, the composition of a healthy woman's is as follows:

1000 parts of milk contain—

Water,	889.08
Sugar,	43.64
Casein,	39 24
Butter,	26.66
Salts,	1.38

For practical purposes, however, it is quite sufficient for the physic to determine the specific gravity, the reaction, the amount of cre and the microscopic appearances of the milk. The first three of th points are to be ascertained in the way already directed in the exa nation of cow's milk. The density of the milk should be about 103 1032. The amount of cream, as tested by the graduated galactome should be at least three per cent. In regard to the reaction, our o observations are not in accordance with the statements of the major of authors. Thus, according to Vogel (*op. cit.*, p. 32), "fresh woma milk is bluish-white or pure white, has a feebly sweetish taste, and *a line reaction.*" In order to determine this point, the following obser tions were made on forty-three women in the Philadelphia Hospital

The subjects chosen were all in good health, and varied in age fr nineteen to forty-one years. They were all suckling their own child who were from nine weeks to eighteen months old, and, in three-four of the instances, in good health and well grown. In a good many ca the children had suffered more or less severely from diarrhœa dur their teething.

The mode of testing was as follows: A few drachms of milk were first expressed from the nipple and rejected; a couple of drachms more were then expressed into a spoon, and tested with litmus- and turmeric-papers. In no instance was there the slightest alkaline reaction with the turmeric. In one instance only was there an acid reaction, and that a very faint one; while in forty-two of the forty-three cases, in nineteen of which the milk was tested twice, on successive days, the reaction was neutral.

It is necessary, in thus testing the milk, to express it into a spoon, since litmus-paper is reddened when applied to the moist nipple.

It would appear, then, from these observations, that woman's milk can, at least, not be regarded as unhealthy on account of having a neutral reaction.

The microscopic examination should determine the quantity and size of the fat-globules, and the presence or absence of colostrum-corpuscles.

The fat-globules, also called *milk-globules*, which are observed in healthy woman's milk, should not be very numerous, and should not vary in size more than from the 0.0012 to 0.0020 of an inch in diameter. The fat-globules, as present in milk, are invested with a delicate albuminous envelope. If the milk be allowed to stand, and the upper stratum of cream which forms be examined, along with the ordinary fat-globules, there will be numerous others of much larger size.

In addition to these fat-globules, there are also found in the milk during the first two or three weeks after confinement, a number of granule-cells, the so-called "*colostrum* corpuscles." These bodies, which present the ordinary appearances of granule-cells wherever found, consist of an aggregation of minute oil-globules in an albuminous basis; they vary from 0.003 to 0.006 of an inch in diameter; and when examined by transmitted light, appear opaque and dark-colored. After the period above mentioned (end of the second week), they should diminish rapidly in number, and only reappear in case the nursing woman is attacked with any acute febrile affection. If, therefore, they are found to persist long after the time mentioned, or if, having almost disappeared, they return in numbers, the milk must be regarded as unhealthy.

After these general remarks on the diet for hand-fed children, which we hope will not be thought too tedious, having regard to the great importance of this subject, not only in thrush, but in all the diseases of childhood, we return to the treatment of the special disease under consideration, thrush.

Few children, with thrush, unless the case be a very mild one, will take the full allowance of milk and water we have assumed to be necessary in the first weeks after birth. It is clear, however, that if the patient be taking only half a pint or a gill a day, it cannot live long on so much less than the natural quantity. It ought to take, under these circumstances, about two or three tablespoonfuls of food every two or three hours, between morning and evening, and once or twice in the night, which would amount to from eight to ten ounces in the day; and this quantity ought to be given if the child can be induced, without forcing, to take so much. If the usual proportion of two parts wa to one of milk, or if the arrowroot and gelatin preparation above r ommended, should be rejected in hard curds, or if masses of undiges curd be found in the stools, it is best, for a few days, to dilute with th or even four parts of the arrowroot solution, or to try for a short ti merely cream and water, one part of the former to three, four, or fi of the latter, returning to the mixture of cream, milk, and water, soon as possible.

In mild cases of the disease, which have been caused by some tem rarily unhealthy state of the nurse's milk, or, as we have seen it, fr the occasional use of artificial food to eke out a diminished supply the part of the nurse, after regulating the diet as directed, the use the following mixture, which we have employed for many years pa will often prove very successful and tranquillizing:

℞.—Sodæ Bicarb.,	ʒss.
Tr. Opii Camph.,	gtt. xl.
Tr. Rhei,	gtt. lxxx.
Syrup. Simp.,	fʒij.
Aq. Menth.,	fʒxiv.—M.

A teaspoonful three times a day.

This dose, continued for several days, or even weeks, will, unless t cause continue in force, relieve the pain and wakefulness, lessen t diarrhœa, and greatly promote the comfort of the child. In connecti with this, the mouth should be touched, once or twice a day, wit solution of nitrate of silver, of one grain to the ounce.

In the *grave form* of the disease it is necessary, after regulating t diet, to employ remedies for the disordered condition of the alimenta canal. These should consist principally of alkalies, astringents, opiat occasionally a dose of some laxative substance, nitrate of silver, and t external exploy ment of baths, warm cataplasms to the abdomen, a sometimes of revulsives.

The *alkalies* usually employed are soda, lime-water, magnesia, cha and prepared crab's-eyes. Of these we prefer, in most cases, the so lime-water, chalk, or crab's-eyes, to be given in the manner which w be recommended in the article on entero-colitis. Dewees recomme very highly the following formula:

℞.—Magnes. Alb. Ust.,	gr. xij.
Tinct. Thebaic.,	gtt. iij.
Sacch. Alb.,	q. s.
Aquæ Font.,	f℥j.—M.

A teaspoonful to be given every two hours until the bowels are tranquil.

He says of it that he has "long adopted it with entire success." conjunction with the internal use of alkalies and astringents, we wo recommend the practice pursued by M. Valleix of employing *op* *enemata* and warm *poultices* containing laudanum, applied upon abdomen. The enemata should consist of one drop of laudanum

onful of starch-water for young infants, to be used morning
ning. The poultices may be made of Indian or flaxseed meal,
etween two pieces of soft gauze flannel, to be secured around
y by a band, and renewed from time to time.
tive remedies are much used in this country in all cases of intes-
sorder. We believe them to be unnecessary, and generally in-
in thrush, except at the onset, and occasionally through the
of the disease, when we may suppose the bowels to contain
lations of partially digested aliment, or highly irritating secre-
Under these circumstances, and only then, from half a tea-
l to a teaspoonful of castor oil, or a teaspoonful of spiced syrup
arb containing half a drop of laudanum, may be prescribed, and
d in case the same condition of things should recur. When once
rhœa with green watery stools is established, we believe all cath-
o be, as a rule, injurious.
tes, in moderate quantities, given in combination with alkalies
ingents, or used by injection or externally, are of the greatest
at all stages of the grave form of the disease. When the diar-
severe and obstinate, and particularly when the stools contain
or blood, or are attended with tenesmic straining, nitrate of
given internally, or used by injection, may be resorted to with
obable benefit. The doses and modes of administration will be
ed under the heads of entero-colitis and dysentery.
authors recommend the application of one or two leeches to
rgin of the anus, or over the left iliac fossa. We think they can
be proper, and if so, only in vigorous, hearty children, and in
resenting strongly marked inflammatory symptoms. When the
oms indicate great exhaustion, or tend towards a state of col-
resort must be had to stimulants, of which the best are weak
and water, or a mixture of equal parts of wine-whey and arrow-
ater.

AL TREATMENT.—The local treatment is important in all cases,
of much less consequence than the general treatment, and par-
ly attention to the diet and other hygienic conditions of the
t. Topical remedies undoubtedly have the effect, however, in
nstances, of arresting the progress of the exudation, and hasten-
e resolution of the disease of the mouth; but we have uniformly
in grave cases, that no remedies applied to the mouth had any
d influence upon the abdominal disease, which is, after all, the
of the fatal termination in the vast majority of cases. The local
ent ought, therefore, to be regarded as adjuvant only to the
l management of the disorder.

ild cases the most suitable local treatment, the one recommended
derwood, Dewees, Eberle, and MM. Trousseau and Delpech, and
which we have generally employed, is the occasional application
mouth of borax. It may be used mixed with an equal quantity
ey, and applied by means of a rag or pencil; or with an equal
ty or two parts of finely powdered white sugar, of which a pinch

is to be put upon the tongue every two or three hours; or in soluti in the proportion of a drachm to two ounces of water. The best m probably is to mix it with honey. If this application fail to arrest deposit of the exudation, we may resort to alum in powder or soluti or, better still, to solutions of nitrate of silver, or to careful cauteri tion with the solid nitrate. The alum may be used in the same m ner as borax, or according to the following formula, recommended M. Valleix:

℞.—Aluminis, ... gr. xv.
Mel. Rosæ, ... ℥ijss.
Decoct. Hordei, ... f℥iijss.—M.

In the use of the nitrate of silver, we should resort to a solution of f grains to the ounce of water. MM. Trousseau and Delpech, howev recommend one of thirty grains to the half ounce, or more frequen cauterize lightly the whole mucous surface with the solid caustic.

Between the applications of any of the above-mentioned remedies, t mouth of the infant ought to be occasionally moistened and clean with some of the mucilaginous solutions, as gum-water, flaxseed tea, that made from sassafras pith, slippery elm bark, or marsh-mall root.

Strict and careful attention must be constantly paid to the state the skin around the anus, and upon the thighs and buttocks. Th parts ought to be well cleansed, after each evacuation of urine or sto by gentle pressure, and not by rubbing, with a fine sponge dipped i tepid milk and water, then dried with a soft napkin in the same m ner, and well anointed with simple cerate, or, what we find better th anything else, Goulard's cerate. These precautions ought to be s more carefully observed if erythema has already made its appearan

Sulphite of Soda ʒi @ f℥i (Jenner) Kills Oidium [illegible]

ARTICLE VI.

AFFECTIONS OF THE TONSILS.

1. ACUTE INFLAMMATION OF THE TONSILS.—TONSILLITIS.—This pa ful affection (known also as angina or cynanche tonsillaris), occurs childhood less frequently, but with the same symptoms as after the of puberty. We have occasionally met with severe cases of it in c dren under the age of 5 years.

SYMPTOMS.—When the attack is sudden, there are marked fever, r lessness or heaviness, and complaints of severe pain on deglutition. the child be old enough to answer questions, the pain will be found radiate from the fauces towards the ear, and to be increased by open the mouth. Painful enlargement of one or both tonsil glands will found by pressing the finger below the angle of the lower jaw. On

the fauces, there is marked redness of the half arches and pos-
rder of the soft palate: the affected tonsil projects from its bed
ded, deep-red body, which may extend even beyond the median
l if, as less frequently happens, both tonsils are severely inflamed
me time, they may even meet and entirely occlude the isthmus
nces. The surface of the gland often presents small yellowish
hich closely resemble patches of false membrane, although
nspection will show that they are beneath the mucous mem-
nd are really only the distended follicles of the gland. Deglu-
so painful, especially for liquids such as milk or water, that
patients will at times utterly refuse to swallow.

E AND DURATION.—The disease lasts from 3 to 7 days, and ter-
in different ways. It very rarely proves fatal, and only
by obstructing breathing, and at the same time so seriously in-
with nutrition that the child's strength fails. In most cases
It is favorable, and the termination is either by suppuration or
resolution of the enlarged gland. When suppuration occurs,
ptoms have gone on becoming more and more aggravated until
ch their height, and the case seems attended with great dan-
n suddenly, after an effort at vomiting, or spontaneously, the
abscess bursts, a gush of pus occurs from the mouth, and
relief is afforded. Occasionally the occurrence of suppuration
d by a chill, or some decided change in the febrile movement.
frequently in children, however, the tonsil does not suppurate
ually becomes smaller; the redness subsides, and the distended
disappear. There is a strong tendency, especially after this
ode of termination, for the tonsil to pass into a state of mod-
ronic enlargement.

NOSIS.—The conditions with which acute tonsillitis in children
apt to be confounded, are diphtheria and scarlatinous angina.
diphtheria it may be told by the more acute and sthenic char-
the symptoms; by the absence of enlargement of any but the
lands, and by the local appearances, particularly the absence of
membranous exudation.

the angina of scarlatina it may be distinguished by the less
t pulse and lower temperature, but chiefly by the absence of
n, so that in some cases the diagnosis cannot be positively deter-
until the time at which the eruption of scarlatina makes its
nce has passed.

TMENT.—So long as the child is able to swallow, quinia may be
n full doses, to diminish the fever, and perhaps diminish the lia-
o suppuration. It may be given combined as follows:

℞.—Quiniæ Sulph.,	gr. xviij.
Tr. Ferri Chloridi,	gtt. xlviij.
Potassæ Chloratis,	gr. xxx.
Syr. Zingiberis,	f℥j.
Aquæ,	f℥ij.

se: Ft. sol. 2 teaspoonfuls 4 times a day, for a child 5 to 7 years old.

If, however, the inflammation be very acute, suppuration will occur in all probability, despite our efforts.

It is almost impossible to make any applications to the throat. That which is most readily effected, and affords as much relief as any other, is the inhalation of steam or vaporized warm lime-water. Warm, slightly sedative embrocations may also be applied to the neck. It is doubtful whether poultices, or any such applications, hasten suppuration sufficiently to make up for the annoyance they cause the child. Even if the occurrence of suppuration be suspected, it is usually impossible to obtain so full a view of the parts as to enable an incision to be made to evacuate the pus. As, however, the abscess will discharge spontaneously in nearly all cases, it is only when the symptoms of obstruction of the throat are very urgent, that it is desirable to insist upon such an examination.

The treatment for the chronic enlargement which sometimes remains after an acute tonsillitis, will be considered in the next section.

2. Chronic Enlargement (Hypertrophy) of the Tonsils.—Causes.—The tonsils are in young children much more subject to this affection than to acute inflammation. The enlargement may begin during the first year of life, but usually does not become sufficient to attract attention until the second or third year. Most frequently it has no connection whatever with previous acute inflammation of the parts, but is chronic and indolent from the beginning. It is often observed that several children of the same family will suffer from this condition, and it is in fact associated in many cases with rickets or with scrofula. We have, however, observed marked and enduring enlargement in children of apparently sound constitution. According to West, the irritation of the latter period of first dentition may be the exciting cause in some of these cases.

We have already alluded to the fact that occasionally, especially in somewhat older children, it has been an acute attack of tonsillitis—either simple or diphtheritic—which has induced the state of chronic enlargement.

Anatomical Appearances.—Both tonsils usually share in the enlargement, though not always to an equal degree. They project into the fauces from either side, forming pale red tumors of rounded form, with a surface that may either be smooth and glistening, or rough and irregular from the rupture of numerous distended follicles. They impart a sense of elastic firmness to the finger when pressed. The exact anatomical condition is in part an enlargement of the follicles of the gland, associated with thickening of the fibro-cellular stroma. The term hypertrophy, commonly applied to this condition, must therefore be regarded as indicating merely the increase in size of the gland.

Symptoms.—There can be no doubt but that many symptoms have been attributed to the influence of enlarged tonsils which are in reality dependent upon entirely different causes.

The results which are constantly observed are loud snoring during sleep, and snuffling, thick voice. There is also often a tendency to

catarrhal attacks, during which the enlargement of the tonsils
ases, and the interference with the breathing and voice is much
ased. Indeed, in some unusually severe cases the respiration is
tantly labored, and the child is annoyed by a frequent dry hacking
h. The pressure of the enlarged glands upon the mouths of the
tachian tubes may produce tinnitus and hardness of hearing. The
serious results which are, by many authors, attributed to enlarge-
t of the tonsils are alterations in the nose and upper jaw, and the
duction of the chicken-breast deformity of the thorax. In conse-
nce of the obstruction of the nasal passages caused by the upward
ssure of the soft palate, the form of the anterior nares may be some-
t altered and contracted, but we are rather inclined to refer the
ll size of the features and the ill-developed upper jaw to the rick-
cachexia which is so frequent a cause of enlargement of the tonsils.
too, the narrowing of the isthmus of the fauces must tend to make
iration difficult, and thus to prevent full expansion of the chest,
we can hardly imagine that such obstruction could produce marked
ken-breasted deformity of the thorax, if it were not for the fact that
such patients there is usually a high degree of rickets coexisting.
nust be borne in mind that precisely this deformity of the thorax is
quently met with in cases of rickets where there is no enlargement
the tonsils. The condition of these glands and the changes in the
s and chest-walls must then, we think, be regarded as results of a
nmon cause. So, too, it is probable that the sudden suffocative at-
ks which have been described as occasionally attending chronic en-
gement of the tonsils have been spells of laryngismus stridulus, de-
ndent upon rachitic disease of the bones of the skull.

ROGNOSIS.—It will be readily seen, therefore, that although this
dition of the tonsils is obstinate, and yields slowly, if at all, to treat-
nt, it is rarely of itself followed by any serious consequences. In
y many cases it gradually subsides after the patient reaches puberty,
ile in others treatment is successful in reducing the enlargement.
have, however, known it to persist most obstinately for many
rs, even after partial ablation and prolonged treatment.

REATMENT.—The frequent association of enlargement of the tonsils
h a rachitic or strumous diathesis must be borne in mind, and if
re is any evidence of the existence of such a constitutional taint, the
propriate treatment must be adopted. Even where no decided evi-
nce can be found, it seems desirable to administer such alterative
les as the iodide of iron, or the compound syrup of the phosphates
iron and alkalies. The prolonged use of cod-liver oil, with iron and
enic, has also proved of service.

ounter-irritation by the daily application of dilute tincture of iodine,
compound iodine ointment, behind and below the angle of the jaw,
y be used, and sometimes appears to favor the reduction of the
lling.

ocal applications to the enlarged glands are of much service in some cases, but to do good must be steadily persisted in, in conjunction proper internal remedies. Those which have on the whole appe most useful to us have been Lugol's solution of iodine diluted two to four parts of water, and nitrate of silver in the form of ra strong solution, as gr. x to the fluidounce.

We have also found it of material service in hastening the reduc of the enlargement to whiten the surface of the tonsils once in thre four days by a light application of solid lunar caustic.

Careful attention to diet, and particularly to the proper and suffic clothing of the child must be insisted on, so as to avoid, as far as sible, the repeated acute attacks of slight tonsillitis which are ap occur. Under the persistent employment of the general and l means above recommended, we have usually found that the hyper phy of the tonsils has diminished towards the age of puberty. In s instances, however, we must confess that all forms of treatment, eral as well as local, have proved unavailing. We must then resor excision of the enlarged glands, if the symptoms caused by their p ence are sufficiently urgent to render it advisable.

The excision of the tonsil (or rather of the prominent portion o for the entire gland rarely needs removal) is an operation attended skilful hands, with little difficulty and no danger. It may be rea performed with a Fahnestock's or Physick's tonsillotome, or, as m operators prefer, by raising the gland from its bed with a special of forceps, and then slicing it off with a bistoury.

The symptoms which would lead us to advise the early remova the tonsils are frequent irritative cough, much interference with h ing or with the tones of the voice, or coexisting rachitic deformit the chest.

ARTICLE VII.

SIMPLE OR ERYTHEMATOUS PHARYNGITIS.

Definition; Frequency.—Simple pharyngitis consists of an eryth atous inflammation of the pharynx, tonsils, and soft palate, unacc panied by ulceration, deposit of false membrane, or gangrene. very frequent both as an idiopathic and secondary disease. We stantly meet with it in children of all ages during the cool month the year.

Causes.—It may occur at all ages, and is equally common in two sexes. It is more frequently a secondary than an idiopathic a tion. The diseases in the course of which it is most apt to occur scarlet fever and measles, and next, pneumonia and bronchitis. often an accompaniment of simple laryngitis. The idiopathic for st common in this city in the late winter and early spring months. is said to prevail sometimes in an epidemic form.

The *exciting causes* of the disease are not always easily detected. In ost instances, however, we believe that exposure to cold is the cause the attack.

ANATOMICAL LESIONS.—In mild cases the alterations of texture ob-rved during life, and in a few instances after death, the patient having ed of some other disease, consist of greater or less redness, swelling, ftening, and a rough or granular and sometimes œdematous condi-on of the mucous membrane covering the soft palate, tonsils, and harynx. The uvula and tonsils are generally tumefied, and the crypts f the latter filled with mucous or purulent fluid of a yellowish color. n one very severe case which proved fatal, MM. Rilliet and Barthez ound the tonsils very red, soft, only slightly swelled, and infiltrated ith pus; the pharynx was covered with a thick layer of bloody mu-us; the mucous membrane of the throat was of a dark red color, hickened, and granular, but not softened. The submaxillary glands ere of a grayish color, enlarged and soft.

SYMPTOMS.—Simple pharyngitis of moderate severity begins with estlessness, irritability, fever, slight cough, and in some instances, pain n the throat, which is complained of by older children, and betrayed n those who are very young by the refusal to nurse or take food, be-ause of the difficulty of swallowing. The *face* is generally flushed, ometimes very deeply so. Young children are often drowsy, but from rritability and fever refuse to sleep except on the lap. The *fever* is arked by acceleration of the pulse, which rises to 100, 110, or more n children over five years of age, and to 120, 130, or 140 in those under hat age, and by unusual warmth or even heat of the skin. At the ame time the *respiration* is generally more frequent than natural, but lmost always regular; in cases attended with high fever, we have ounted the breathing at 42 and 50. *Auscultation* reveals pure vesicular urmur or slight sibilant rhonchus. The *voice* is clear, or, in rather everer cases, obscured and nasal, and in some instances, speaking is ainful and difficult. *Cough* is a frequent symptom. It was present in 0 of 25 cases observed by ourselves. In 6 of these it was harsh and roupal, so that the children seemed threatened with croup. The roupal sound seldom lasted over one night, after which the cough was erely hoarse, and gradually became loose towards the termination of he attack. In the remaining cases it was rare and dry in the begin-ing, and more frequent and looser as the disease progressed. *Pain* is frequent, but far from constant symptom at the outset of the disease. It generally exists during deglutition. When present it is shown in nfants, as stated, by their refusing the breast, or nursing only at long ntervals, and with difficulty; while in older children it is complained f. It is not, however, a constant symptom, as we have often seen hildren of one, two, and three years old, with severe angina produc-ive of violent fever, who swallowed fluids and soft solids without a ign of pain. Of 22 cases in which the state of this symptom was particularly noticed by ourselves, it was present only in 7. Throughout the acute period of the disease there is generally considerable *thirst;* the *appetite* is diminished or entirely suppressed; the *stools* are usually natural, or there is slight constipation.

The throat should always be examined when there is the least reason to suspect that an attack of sickness depends upon inflammation of that part, and whenever a child has been seized suddenly with fever, particularly in cold weather, and there is nothing more evident by which to explain the illness. To examine this part well, the tongue must be strongly depressed with the handle of a spoon, which should be carried back to the base of the tongue. This may be done in the youngest infant.

The *appearances* presented by the throat are as follows: The soft palate, uvula, tonsils, and generally the pharynx also, are more or less reddened and swelled, and the mucous membrane commonly looks rough and granular. The fauces are often filled with frothy mucus, and in severe cases coated all over with mucous or purulent secretions, which sometimes line the inflamed surfaces in such a way as to resemble false membranes. They are to be distinguished only by careful examination, and by removing a small portion on a pencil or sponge-mop, in order to ascertain their real nature. We have seen the mild form of inflammation in a child ten days old, in one eight weeks, another three months, and a fourth nine months old.

Dr. Wertheimer (*Jour. für Kinderkrankheiten*, Band xxxii) calls attention to a variety of angina, which he calls œdematous, and which is specially characterized by serous infiltration of the submucous tissue of the pharynx, the mucous membrane itself being pale and smooth, and soft and sticky to the touch.

The *submaxillary glands* and neighboring cellular tissue are sometimes swollen, in consequence of the extension of the inflammation to them. This is often evident to the eye, but it is more correctly judged of by the touch. At the same time the glands are usually somewhat painful to the touch. The amount of swelling is slight in very mild cases, or there may be none at all. In severer cases it is much more considerable.

The *breath* is said to be often fetid. We have not met with this character in the simple disease. *Expectoration* is rarely present. We have never noticed it under six years of age. Slight *nervous symptoms* occur in nearly all the cases, consisting, as already stated, of restlessness and irritability in mild attacks, and of insomnia or drowsiness, with starting and twitching, in those which are more severe.

The fever generally occurs at first only in the after-part of the day and during the night, often becoming intense at that time, with restlessness and starting, and subsiding or disappearing entirely towards morning, to recur again the next afternoon or evening. Children not unfrequently play about all the early part of the day, and are attacked with the symptoms just mentioned as night comes on. The disease generally pursues this course for three or four days, and then passes ay entirely or, if it lasts beyond that time, the fever becomes con- ned, and the attack runs on for seven, eight, or ten days.

In *grave* cases of simple angina, the disease begins with *vomiting*, *fever*, d severe *nervous symptoms*, in the shape of excessive restlessness, or mnolence, and occasionally convulsions. The fever is violent, the lse being very frequent and full, and the skin hot and flushed. The tense heat and flushing of the skin, which in sanguine children some- nes affects the greater part of the surface of the body, together with e activity of the circulation, not unfrequently make the onset of the sease resemble very closely that of scarlet fever. Four cases of this nd that have come under our notice presented severe nervous symp- ms at the invasion. In a girl between two and three years old, they nsisted of wildness and ecstatic expression of the face, and trembling certain movements of the limbs, which would probably have termi- ted in convulsions, but for the timely interposition of a warm bath. the three others, general convulsions occurred. Two of the subjects which convulsions took place were between five and six years old, nd one between three and four. In two the convulsions occurred at e onset, and in a third on the second day. The convulsive move- ents lasted from ten to twenty minutes, and were followed by somno- nce for a few hours in two, and by stupor for a day in the third. It ould be stated, however, that two of these subjects were predisposed y constitution and temperament to spasmodic attacks, as one had had fit previously from a similar cause, and the other two from difficult entition. The third had never suffered from any symptoms of the ind, and did not appear predisposed to them.

The *tongue* is generally dry and coated with a thick whitish fur in rave cases; the *respiration* is quick, loud, and nasal; and the *voice* gut- tral or nasal, and difficult. There is usually extreme *thirst*, and not nfrequently delirium. The throat is commonly violently inflamed, of deep-red color, and coated over with mucous or purulent secretions. he submaxillary regions are often swelled, and the deglutition some- mes, though not always, difficult. When the disease proves fatal, the ifferent symptoms soon reach their height, and death may occur in wo or three days. We have never, however, known simple pharyn- itis to terminate fatally. The *duration* of the grave cases is variable. n the four that we have noted, it was between three and eight days.

Secondary pharyngitis, which, as has been stated, is a very frequent isease, will be treated of in the articles on the various diseases in the ourse of which it occurs.

Diagnosis.—The diagnosis of simple pharyngitis is not always with- ut difficulty, as there are no local symptoms in two-thirds of the cases t the invasion, nor in some instances at any period of the attack. The hysician and attendants, therefore, are often deceived as to the real ause of the violent fever which has so suddenly made its appearance, nd are disposed to refer it to any but the true one.

It has happened to us several times in cases of children attacked with imple angina, to suspect pneumonia from the sudden occurrence of fever, rapid respiration, slight, dry cough, and the absence of pain in the throat, difficulty of deglutition, or other symptoms, to call our attention to the real seat of disease. The diagnosis is to be corrected only by the absence of the physical signs of pneumonia, and the consequent necessity of finding some other cause of the sickness. Angina may be mistaken also for indigestion, which is one of the most frequent causes of sudden fever in childhood, and is accompanied, like severe angina, by vomiting. The distinction between the two is to be made by careful inquiry as to the history of the attack, by examination of the matters ejected from the stomach, and by inspection of the throat. Severe cases, particularly when ushered in by convulsions, may be mistaken for disorder of the nervous system dependent upon dentition. The only method of ascertaining the truth is again the inspection of the throat. Cases of this kind might also be mistaken for the beginning of scarlet fever. Time only, and the development or absence of the symptoms peculiar to the latter disease, could enable us to determine the diagnosis.

The diagnosis between simple and pseudo-membranous pharyngitis will be given under the head of diphtheria.

PROGNOSIS.—Simple pharyngitis of moderate severity is very rarely, if ever, a fatal disease. Severe or grave erythematous pharyngitis, on the contrary, is often a dangerous malady. The four cases that have come under our care, however, all recovered. The unfavorable symptoms in such cases are: very violent fever, greatly altered physiognomy, difficult respiration, choked and guttural voice, excessive jactitation, delirium, convulsions, and coma.

TREATMENT.—Mild cases of simple angina need but little treatment. The child ought to be confined to a warm room in all cases, and kept in bed, or on the lap, if it have fever. The diet must be restricted to milk preparations and bread, so long as the fever continues. The therapeutical part of the treatment may consist in the use of some mild evacuant, as one or two teaspoonfuls of castor oil, half a teaspoonful or a teaspoonful of magnesia, a small quantity of syrup of rhubarb, or what is all-sufficient in many cases, a simple enema. At the same time we may give, if the frequency of pulse, heat of skin, and restlessness be considerable, a few doses of spirit of nitrous ether, or spiritus Mindereri, alone, or combined with from one to four drops of antimonial wine, according to the age. A warm bath, if the child is not afraid of it, is an admirable remedy when there is much excitement of the circulation; or a foot-bath, containing salt or mustard, may be used. Frictions over the throat and neck are often very advantageous; they may be made with hartshorn and sweet oil, with or without the addition of laudanum, or a small quantity of spirit of turpentine may be applied upon the skin, so as to produce slight counter-irritation. When there is much pain and difficulty of deglutition, the case is best treated by the use of nitrate of silver in solution (5 or 10 grains to the ounce), or of powdered alum, applied by means of a large throat-brush.

In the *severe form* of the disease the treatment must be much more

ive than in mild cases. When the fever is very high, and threaten-
g nervous symptoms are present, the most speedy means of control-
g them is a warm bath, continued for fifteen or twenty minutes. If
e effects of this should be slight or transitory, one or two leeches may
applied behind the angles of the jaw, unless the fright and conse-
ent resistance on the part of the child are so great as to render their
plication objectionable. Some evacuant dose should be given early
the attack; it may consist of castor oil, magnesia, epsom salts dis-
lved in lemonade, fluid extract of senna, or infusion of senna and
anna. The quantity must be sufficient to produce several copious
ools, and should it fail to operate in three or four hours, and the fever
ntinue, it is always well to assist it by means of a purgative enema.
wo hours after the exhibition of the cathartic, it will be proper to
sort to small doses of sulphuret of antimony with Dover's powder,
peated every hour and a half or two hours, in the manner recom-
ended in the article on pneumonia. If the secretions into the fauces
very abundant and tenacious, so as to impede respiration, the best
eans of getting rid of them is by an emetic of ipecacuanha or alum.
they collect again, the throat ought to be cleansed from time to time
ith a small sponge-mop. The inflamed surfaces should be touched
o or three times a day with a solution of nitrate of silver (from five
ten grains to the ounce). The late Dr. C. D. Meigs was in the habit
employing with much benefit, in the severe angina of children,
hether idiopathic or secondary, a wash made according to the follow-
g formula:

℞.—Cupri Sulphat.,	
Quiniæ Sulphat., āā,	gr. vj.
Aquæ Destillatæ,	f℥j.—M.

his is applied in the same way as the lunar caustic solution, and we
ave frequently seen it produce most excellent effects.
The four grave cases observed by ourselves recovered under very
mple treatment. This consisted in the use of the warm bath, of
oses of castor oil to move the bowels freely on the first day, and of
rup of rhubarb or enemata afterwards to keep them soluble; of doses
antimonial wine and nitre every two hours in such quantity as to
oid sickness; of mustard foot-baths; stimulating frictions to the
tside of the throat; applications of lunar caustic solution to the
roat internally, three or four times a day; and of rigid diet. In one
se the warm bath was used three times in a single day, because of
e extreme restlessness and heat of the skin, and was productive each
me of much benefit.

ARTICLE VIII.

RETRO-PHARYNGEAL ABSCESS.

This name is applied to collections of pus formed in the cellular tissue between the posterior wall of the pharynx and the vertebral column. More frequently the abscess is seated quite high up on the level of the glottis, though cases are recorded where it occupied a lower position behind the œsophagus.

Causes.—Retro-pharyngeal abscess occurs idiopathically, or as a sequel to some of the specific fevers, or, more frequently, in connection with caries of the cervical vertebræ. In one of our own cases, it followed directly upon a long sleigh-ride, and was due evidently to the severe chilling of the body. Although it cannot be regarded as a disease peculiar to childhood, it is far more frequent in the first ten years of life than during any subsequent decade.

Symptoms.—The early symptoms are irregular and not characteristic. In cases where the abscess is connected with caries of the cervical vertebræ, the symptoms of this latter condition have preceded. In all cases, however, the first indications which lead to a suspicion of the existence of a post-pharyngeal abscess are gradually increasing difficulty of swallowing and of respiration, which is attended with a loud, stertorous sound, unlike the stridulous breathing of croup. There is also marked stiffness of the neck, and the head is rigidly retracted. Any effort to bend the head forward is followed by urgent increase of the dyspnœa, and the same result has been noticed to follow when the recumbent position was assumed. There is an appearance of fulness on one or both sides of the neck behind the angle of the lower jaw. Of course the child presents a high degree of restlessness and distress, which increases until the interference with breathing and swallowing may prove fatal from combined exhaustion and asphyxia. In the presence of such symptoms as the above, a careful examination of the pharynx, both by direct inspection, if possible, and by the finger, should immediately be made. The mouth is usually filled with mucus, but the swelling of the posterior wall of the pharynx may frequently be seen projecting forward so as to constrict the pharyngeal space, and obstruct more or less the opening of the glottis. The finger, if carried back over the root of the tongue, comes in contact with a rounded swelling, which is in the early stages firm and somewhat elastic, and later becomes fluctuating. When the abscess is fully formed, the most prominent point may appear yellowish. Occasionally in the course of caries of the cervical vertebræ, perforation of the posterior wall of the pharynx occurs without being preceded by any such severe symptoms as have just been described as due to post-pharyngeal abscess. We have thus known the expectoration of purulent matter with small fragments of carious bone, to occur such cases without any previous symptoms of marked obstruction swallowing or breathing.

Diagnosis.—The recognition of this affection is often difficult, and it only by bearing in mind the possibility of its occurrence, and making reful examination with the finger, that we can avoid overlooking its xistence, in cases where the symptoms are not clearly pronounced. In l cases, therefore, where difficulty in swallowing is superadded to yspnœa, such an examination should be made. The affection with hich it is most likely to be confounded is membranous croup, but the bsence of the peculiar croupy cough and stridulous breathing, and the xistence of dysphagia, retraction of the head, with immobility of the eck, fulness at the angle of the lower jaw, and, finally, the detection f the swelling at the back part of the throat, will render the diagnosis asy.

Prognosis.—The termination is always doubtful. When, however, he existence of the abscess is early recognized, and it is promptly vacuated so soon as fully formed, recovery frequently ensues. Even hen connected with caries of the vertebræ, the prognosis, although f course unfavorable from the nature of the primary disease, is not ecessarily fatal. In the case already referred to as having followed irectly upon long exposure to severe cold, the child was very ill, with all he characteristic symptoms of this affection, for a week, after which he abscess burst spontaneously, and the child recovered.

Treatment.—The approach of a post-pharyngeal abscess can rarely e detected so early as to enable any preventive treatment to be adopted ith success. Indeed, but little could be expected from the use of mild ounter-irritants, or absorbent applications to the throat. In older chilren, if recognized before suppuration has occurred, some benefit might e derived from the use of one or two leeches to the angles of the jaw, r of a blister to the back of the neck. The use of small pieces of ice eld in the mouth will also be found to afford relief. The main indicaion, however, is to watch for the occurrence of suppuration, and then o make as early an incision as possible. When the seat of the abscess s high up this may be done by an ordinary sharp-pointed bistoury, hose blade is guarded up to near the point by being wrapped with ticking-plaster. When the abscess is lower down it can sometimes be more safely reached and evacuated by a trocar and canula. As the opening should be small, there is danger of its closing with a re-accumulation of pus; and it is therefore advisable, as recommended by West, to press with the finger upon the sac of the abscess occasionally for a day or two. In cases dependent upon caries of the vertebræ, it is better to postpone opening the abscess until urgent symptoms are produced by it. Here also it is necessary to employ the other means of treatment suitable for that condition, and especially the use of some mechanical contrivance by which the weight of the head can be supported, and thus relief be afforded to the cervical spine. During the course of the disease every effort must be made to sustain the strength of the patient. If the interference with swallowing be extreme, nutri-

tious enemata may be used until the abscess can be evacuated.
addition, we must use opiates in sufficient amount to quiet the exce
pain and restlessness.

CHAPTER II.

DISEASES OF THE STOMACH AND INTESTINES.

GENERAL REMARKS.

In our division of these diseases, we shall treat first of Indiges
using this term to signify morbid conditions of the digestive func
which we suppose to be the result of functional disorder, or of
acute or chronic catarrh of the stomach. Under the title of Gast
we shall describe the much more rare and dangerous form of dis
in which there is acute inflammation of one or more of the coats o
stomach, and which is seldom met with except as the consequen
the application of some direct irritant to the organ.

We shall then describe Simple Diarrhœa, in which we suppose th
testinal disorder to be either merely functional, or one of slight c
rhal inflammation of the mucous membrane. Next, under the tit
Entero-colitis or Inflammatory Diarrhœa, we shall treat of that fo
diarrhœa which is now by many writers styled acute or chronic cat
of the intestinal mucous membrane, and the chronic forms of whic
believe to be of the same nature as the disease designated by mo
the observers whose experience was gathered in the vast field of
late war, chronic diarrhœa. We shall pass on then to Cholera Infan
limiting this term to cases in which the disease is of a true chol
type; and, lastly, we shall consider Dysentery. We have also a
separate articles on the diseases of the Cæcum and Appendix V
formis, and upon Intussusception.

SECTION I.

FUNCTIONAL DISEASES OR MILD CATARRH OF THE STOMACH AND INTESTINES.

ARTICLE I.

INDIGESTION.

Definition; Frequency; Forms.—By the term indigestion, we
that condition of the stomach in which its function of digestion i

nd is one of great importance on this account, and from the fact aying the constitution open, by the debility and cachexia which ıuces, to various secondary affections. In our description of the , we shall distinguish between the forms which occur during in- and after the completion of the first dentition.

SES.—The principal causes of indigestion in infants are an un- y state of the milk of the nurse, the use of artificial diet, and an impaired condition of the digestive function, which disables mach from digesting even the most healthful aliment.

milk of the nurse may be too old for the child, for it has been that a breast several months old, sometimes, though not always, ees with a young infant, in consequence, no doubt, of the milk thicker and richer at that time than immediately after parturi- The breast-glands may continue to secrete colostrum for weeks n months after parturition, and when this is the case the child is sure to suffer from indigestion and diarrhœa. The milk may be lesome because the nurse is in bad health, or because her diet is operly regulated. That the diet of the nurse affects her milk, e no doubt, though it has been denied by some persons.

have known several children to suffer from indigestion, attended omiting, acid secretions, colic, and diarrhœa, in consequence of rse having indulged in a very rich diet, and particularly in vege- and fruits. We do not mean to assert that all nursing-women abstain from fruits, or even live on a very simple diet, for we known some who could make use of the richest food, and eat antly of all kinds of vegetables and fruits, without the least in- the child. But there are others who cannot do so without occa- g indigestion in their infants, because, probably, their children usually susceptible to the action of the materials absorbed from ind of food. Again, it is clearly proved by recorded cases and by inions of various authorities, that the milk of the nurse is affected entero-colitis, cholera infantum, and thrush. Very few escape frequent attacks of one or other of the diseases just named. Much depends, no doubt, on the selection and preparation of the food. It may be stated as a well-established fact, that a diet consisting wholly or in a great part of farinaceous substances, very rarely fails to disagree with the child, and to produce indigestion and other disorders of the digestive system, which often prove fatal; while one in which cow's or goat's milk enters as the principal ingredient, though inferior to the natural aliment, and often productive of indigestion, is far less injurious than the one before spoken of.

A third cause of indigestion was stated to be the absence or loss of the digestive power of the stomach, independent of the nature of the food. This is a condition similar to the dyspepsia of the adult. It may be congenital or may result from causes brought into action after birth. It often remains as a consequence of previous indigestions from improper or excessive feeding. It exists during the invasion, course, and convalescence of various diseases. Dentition frequently diminishes or impairs the tone of the digestive function, so that the child is often unable, during that process, to digest aliment which had agreed with it perfectly well at other times.

The causes of indigestion after the completion of the first dentition are congenital feebleness of the digestive function; a certain want of power of that function, which remains often for years in children reared upon artificial diet, and in those who have been debilitated by frequent attacks of disease of any kind; the habitual use of improper diet; the eating of crude, indigestible food; the process of the second dentition; the want of due exercise in the open air; residence in large cities; and undue exercise of the mental faculties in the conduct of the education of the child.

Symptoms.—We shall describe first the symptoms of indigestion as it occurs during infancy, and secondly as it occurs during childhood, or after the completion of the first dentition.

Indigestion during infancy may be advantageously considered under two heads: as occasional or accidental, and as habitual. By the former we mean that which occurs in a healthy infant from a transient cause, such as repletion or a momentarily unhealthy state of the nurse's milk from some imprudence on her part as to diet, from some moral cause, or from sickness; and that which depends upon the passing influence of dentition. By habitual indigestion, we mean the form of the affection which is long continued in consequence of a persistence of the cause.

The symptoms of *occasional* or *accidental* indigestion in infants are: paleness and contraction of the face; restlessness and peevishness; moaning and crying, or in some cases, screaming; nausea, shown by excessive paleness, often by very great languor, and by occasional retching, which may either subside without vomiting, or as more frequently happens, terminate in that act; flatulent distension and hardness of the abdomen, especially in the epigastric region, often accom-

nd of simple diarrhœa repeated for days, weeks, or months in
sion; paleness, or some other unhealthy tint of the cutaneous
e; continual restlessness and discomfort, with fretting or crying,
ılarly in the after part of the day and during the evening and
in place of the natural ease and quiet of a healthy infant; con-
fits of the most violent screaming from colic, sometimes lasting
urs; dull and languid expression of the countenance, or else an un-
contracted look, like that produced by continued suffering; more
emaciation; failure of the natural growth in stature and size, so
he child is small and puny for its age; want of calorific power,
g the child to suffer unusually from cold, as shown by frequent
ss of the hands and feet; irregular appetite, which makes it
ary to tempt by frequent changes of the food, or more or less
ete anorexia; and lastly, the various symptoms that indicate an
erished state of the blood and bad nutrition.

ome cases there are added to the above symptoms, or there fol-
a consequence of the indigestion, those of gastritis or entero-col-
be hereafter described. Indigestion probably seldom proves
n infants, except from the occurrence of some inflammatory com-
ion, as for instance, one of the diseases just named, or acute dis-
f some other principal organ.

igestion in children who have completed the first dentition may,
the case of infants, be occasional or habitual. *Occasional indiges-*
ccurs in strong and vigorous, as well as in more delicate subjects.
ttack generally begins, within a few hours or a day after the
has eaten some indigestible substance, with languor and chilli-
n older children, and with languor and peevishness in those who
ounger; after which there is headache, pain in the stomach in
of the cases, and very often a disposition to somnolence. If the
is attacked with vomiting soon after the appearance of these

abdomen is natural, or hard and distended over the epigastric region. When the symptoms just described make their appearance suddenly, by which we mean in the course of a few hours, in a child two, three, four or five years old, after it has eaten some indigestible substance, there is reason to fear an attack of convulsions. The probability of the occurrence of this accident is great in proportion to the earliness of the child's age, and the impressibility of its nervous system. The attack is particularly to be apprehended, and should be carefully guarded against, whenever the fever is violent, especially if the pulse runs very high, when there are urgent complaints of headache, when the restlessness and agitation are very great, or when there is somnolence, with frequent startings or twitchings of the muscles. Convulsions sometimes occur without any previous warning, or after such slight signs of disorder as would fail to produce uneasiness in the parents or attendants.

The symptoms produced by occasional indigestion generally continue until nature relieves the stomach by vomiting or diarrhœa, or until the remedies proper in the case, the most important of which are evacuants, have been administered. It happens not unfrequently, that symptoms of gastric or intestinal disorder remain for some days after the violence of the attack is subsided, and in some instances the disturbance is so great as to occasion gastritis, entero-colitis, or dysentery.

Habitual indigestion in children who have completed the first dentition, is not at all an uncommon affection. It is a condition analogous to, if not identical with, the dyspepsia of the adult. The symptoms of this form are the following. The general appearance of the child is delicate, as shown by a pallid or sallow tint of the skin, instead of the ruddy complexion of health, by thinness and want of proper development of the limbs and trunk, and by softness and flaccidity of the muscular tissues. There is an habitual air of languor and listlessness, with absence of the usual gayety and disposition to play natural to the age, and the child often complains of being tired. The appetite is feeble or uncertain, being sometimes absent, and at other times too great; or it is peculiar, there being a willingness to eat of dainties, but a refusal of food of a simple character. The tongue presents nothing peculiar. It is, however, more frequently somewhat furred than clean and natural. The temper is usually irritable and uncertain. The child rarely sleeps well; on the contrary, the nights are restless and much disturbed, the sleep being broken and interrupted by turning and rolling, by moaning or crying out, and by grinding of the teeth. These latter symptoms, together with picking at the nose, which is a frequent accompaniment, are almost always referred by the parents and nurses to worms, and it is often impossible to convince them to the contrary, even though frequent and violent doses of vermifuges have failed to show the existence of entozoa. The state of the bowels is uncertain. In some instances they are very much constipated, requiring frequent doses of laxatives, or careful regulation of the diet, to keep them soluble;

er and quantity of the matters ejected from the stomach, the
of symptoms indicating the invasion of any other disorder, the
ration of the symptoms, and the rapid recovery, all render the
ure of the case very clear. That which occurs in older children,
contrary, is not so easy of diagnosis. In many cases the inva-
ιot unlike that of scarlet fever. The vomiting, the rapidity of
e, the great heat of the skin, and in some cases a certain suf-
f the integument dependent on the activity of the circulation,
er the case doubtful for some hours, or for a day, after which
e difficulty ceases, from the development of the symptoms pecu-
he disorder. We believe that not a few cases of simple angina
aken for indigestion, owing to the absence of complaints of sore
and the neglect of the physician to examine that part. In such
e vomiting and sudden attack of fever are ascribed, for the want
er mode of explaining them, to gastric derangement. The diag-
n be made only by examination of the fauces. The diagnosis
estion accompanied by convulsions, will be considered in the
n the latter affection.

habitual indigestion of infants is not likely to be confounded
y other disease. The absence of fever, of tenderness of the ab-
n pressure, or other acute symptoms, all indicate the depend-
the disorder on functional distress of the stomach. The same
apply to this form of the disease occurring in older children.
eless, the practitioner should never neglect to make a careful
ation, both of the physical and rational signs, of all the impor-
ans of the body, as it sometimes happens that latent disease of
e of them is the cause of the gastric difficulty.

NOSIS.—The prognosis of occasional indigestion is nearly always
le. It is rarely a dangerous disorder, unless accompanied by
ions, or some other sign of violent disturbance of the nervous

fatal, it is exceedingly apt to prove so by the induction of gastritis, chronic enteritis, entero-colitis, or thrush, or by its laying the system open to other diseases, and rendering it less able to withstand them should they happen to occur. In older children it is not, according to our experience, so dangerous a malady. We have never, as yet, seen it terminate fatally.

Treatment.—The treatment of *occasional indigestion* in infants ought to be very simple. The child has generally relieved itself by vomiting before the physician is called. If, however, it continues pale and languid, with vomiting or retching, after the stomach seems to have been emptied, the proper plan is to make use of remedies to calm the irritability of that organ. This can almost always be accomplished by giving a teaspoonful every ten or fifteen minutes of a mixture of lime-water and milk, consisting of one-third milk to two-thirds lime-water, or of equal proportions of each, or the same doses of a mixture consisting of equal parts of lime-water and cinnamon-water. At the same time a small mustard plaster, weakened with wheat flour, or flannels wrung out of hot brandy and water, may be applied to the epigastrium, or a warm Indian mush poultice, in a flannel bag, laid over the whole abdomen. Should these means fail to relieve the sickness, from half a drop to a drop of laudanum, or ten drops of paregoric, may be administered, and repeated, if necessary, in two hours. The child generally recovers its usual health after the sickness has entirely ceased. If, however, it remain fretful and uneasy, if it cry much as though in pain, it is probable that a portion of aliment has passed, in a partially or wholly undigested state, into the intestine. The suspicion will be confirmed if the abdomen is found, upon palpation and percussion, to be swelled, hard, and resonant from flatulent collections in the bowels. Under these circumstances, a laxative ought to be given. The best dose is half a teaspoonful or a teaspoonful of castor oil, a teaspoonful of simple or spiced syrup of rhubarb, or, if there have been evidences of an acid state of the stomach, about a quarter of a teaspoonful of the best magnesia.

The *occasional indigestion* of older children demands a different and more energetic treatment. After ascertaining that the child has eaten something indigestible, we should inquire whether there has been vomiting. If there has been none, or if only slight, it will be proper to give an emetic immediately. The best one under the circumstances is ipecacuanha. This rarely fails to produce a full effect, and does not perturbate the system, or irritate the stomach, like tartar emetic. It may be given either in powder or syrup. The dose is familiar to every one. If the ipecacuanha be not at hand, we may use hive syrup, which is kept in almost every house, or a teaspoonful of powdered alum in honey or molasses, to be repeated, if necessary, in fifteen minutes. Alum is less apt to fail than either ipecacuanha or hive syrup. If the child continue unwell after the operation of the emetic, which is often the case, and particularly if the fever be considerable, a purgative should be given as soon as the stomach will bear it. The best dose is castor oil, which is the most speedy and least irritating. It may be

. The child should be kept in the bath from eight to twelve or n minutes. The only circumstances which form an objection to emedy are the facts of the patient being so irritable, or so fearful e water, as to make it necessary to contend with him in order to ed in using it. When this is the case, it had better not be emd, and sponging with tepid water and spirit should be substituted. e child complains of pain in the stomach, the application of a warm poultice over the epigastrium or whole abdomen will be found of service.

hen, in this form of indigestion, the febrile reaction is violent, as en is, and particularly when there are signs of great disturbance e nervous system, consisting of excessive agitation, complaints of e headache, drowsiness, moaning or crying out in the sleep, or hing and jerking of the muscles, the physician should beware of a ulsive attack. In such cases as these, the patient ought to take a ative dose of calomel (from two to three grains), or a dessertnful of castor oil, have a warm bath at once, and soon after an inon. The remedies ought to be prompt and energetic, for the case essing. A convulsion is always a dangerous event in childhood, should be prevented if possible. If calomel has been given, a catic dose ought to be administered about two hours afterwards, in r to insure an action upon the bowels, and to carry the calomel out e system. These means rarely fail to afford relief in a few hours. diet should be absolute during the violent stages of the attack, and usual diet is to be resumed only by degrees. The drinks may be water or gum-water, taken cold.

not unfrequently happens that occasional indigestion is followed astritis or enteritis, or by habitual indigestion lasting for weeks or months. These different sequelæ must be treated according to the proper for each.

milk of the nurse should be carefully examined, in order to ascertain whether it be good. If found to possess any unhealthy qualities, the nurse ought to be changed at once. Attention to this point alone will almost certainly cure the child. It needs no other remedy.

If the patient is fed wholly or in part, it is essential to regulate the diet to suit the state of the digestive function. Milk ought in all cases to form the basis of the food, unless it has been found by patient trial to be absolutely repugnant to the stomach. We have often found that infants who had been thought quite incapable of digesting cow's milk, could do so very readily when it was very much weakened with water. The usual proportions for an infant of a few months old, are half and half, or two parts milk for one of water. When these are found to disagree, it is well to try three, or even four or five parts of water to one of milk, and if the stomach digest this, as it often will, the proportion of milk may be slowly and cautiously increased to the usual standard. If we conclude that milk cannot be digested by the child, it is best to try cream. Of this, one part to three or four of water may be given. When neither of these can be taken, some of the farinaceous substances may be tried; arrowroot, sago, barley, tapioca, oatmeal, or rice. We are clearly of opinion, however, that these articles prepared with water alone, never agree with children when they are continued for any considerable length of time. Some infants of six or eight months old, it may be remarked, who cannot digest more than very small quantities of milk, will take and digest well, very delicate broths made of chicken or mutton, or small quantities of the lightest meats, as mutton, chicken, or very tender beef, minced up extremely fine, and given by teaspoonfuls.

In cases of this kind we have found a diet consisting of gelatin, milk, cream, and arrowroot, prepared in the manner directed in the article on thrush (see p. 338), to suit better than anything else. We have met with a number of children, whom it was necessary to feed to the amount of a pint or a pint and a half a day, in addition to their being nursed occasionally, who could take neither milk and water, cream and water, milk and arrowroot, oatmeal gruel, rice gruel, nor indeed anything that was tried, without vomiting, colic, and severe diarrhœa, who digested perfectly well and throve admirably upon the preparation alluded to. We have now used it during many years, and have recommended it for a great many children, and do not hesitate to say that it agrees with a larger number than any diet we have employed or seen employed.

The diet of older children laboring under chronic weakness of the digestive function is as important as that of infants. Two chief ends should always be borne in mind in selecting it, digestibility and nutritiousness. The former is all-important, for without it, the stomach, constantly irritated by improper food, has no chance of regaining its tone, while the latter is necessary in order to sustain the strength of the child, and allow it to carry on its growth. We have generally found it most prudent, and often really necessary, to specify as to the substances to be given at each meal. The morning and evening meal ought

at the potato is more digestible when roasted than when boiled.
hild require anything between breakfast and dinner, it may have
allowed at breakfast, or dry bread and nothing else. There are
articles of diet which should be absolutely forbidden, amongst
are hot and sweet cakes, and hot bread of all kinds; sausages,
requently given to children in this country; corn-beef, ham, veal,
oose, ducks, fish; all manner of dessert, excepting rice-pudding,
ls-and-whey, often called junket; sweetmeats, candies, fruits,
some of our finest summer ones; and to conclude, everything
long observation and experience have shown to be unsuitable to
eptic stomach.

sometimes very difficult to find anything to agree well with the
In one case of a child three years old that came under our ob-
on, neither milk, bread, nor meat, could be taken. The casein
seemed to be absolutely indigestible, as it would be rejected
e stomach many hours, or even a day or two after the milk had
ken, in the form of masses of dry, fibrous cheese, of an oblong
nearly or quite as large as a peachstone. After trying various
, we found that the child digested raw oysters, soda-biscuit, and
whey, and upon these articles alone she lived for two weeks, at
of which time she had improved so much as to be able to take
ite meat of chicken very finely minced. She gradually regained
vious health.

r regulating the diet, such remedies as tend to invigorate the
ve functions ought to be prescribed. The most important of
re the vegetable and mineral tonics, and mild stimulants. We
und quinine, iron, and small quantities of port wine or brandy,
eed better than anything else. To a child under two years old,
quarter to half a grain of quinine, and to one over that age, a
may be given three times a day, and continued for two, three,
r weeks. It is best given to young children diffused, without

or suspended in syrup of gum arabic. When there is any suspicio a scrofulous taint in the child's constitution, or when it is disposed have chronic irritations, excoriations, or ulcerations of the nost otorrhœa, or papules or pustules about the eyelids or other parts of body, it is useful to give the iron in compound syrup of sarsaparilla which half a teaspoonful three times a day is quite enough. Un these circumstances, and particularly when the dyspeptic conditio accompanied with frequent nausea or occasional vomiting, with fron headache, and with constipation, seeming to indicate a disposition tubercular deposit in the system, we have found cod-liver oil the m efficient of all the remedies that we have tried. It has often remo with great rapidity the dyspeptic symptoms, invigorated the gene health, and, in fact, restored the patient to health. The dose is fr half a teaspoonful to a teaspoonful twice or three times a day, at age of six or eight years. It is best taken in a small quantity of m liquor, or floating on strong mint-water, or syrup of ginger. In v young children, and in older ones also, when the latter refuse to t it in the ordinary methods, the following formula for its administ tion will be found one of the best:

℞.—Ol. Jec. Aselli,	f℥ss.
P. G. Acaciæ,	q. s.
Ol. Cinnamomi, vel Ol. Gaultheriæ,	gtt. vj.
Sacch. Alb.,	q. s.
Aq. Cinnamomi,	ad f℥iij.
Ft. mistura.	

Dose, a dessertspoonful three times a day, after eating.

The recent introduction of the use of pepsin in the treatment of orders which, like the one under consideration, are characterized b want of digestive power, is a most valuable improvement in their m agement. It is nearly always perfectly well received by the stoma and in very many cases will enable the child to take and thoroug digest the proper amount of suitable food, which before would have evitably caused evidences of gastric embarrassment, with the reject of a considerable part of the meal in an undigested state by vomit or stool.

Pepsin may be administered in the form of powder—the best pre ration of which is that now sold under the name of saccharated p sin—and the proper dose of which for a young child is two or th grains taken immediately after meals. Or we may use the liquor p sinæ, which is a solution of this substance in glycerin and water, aci lated with muriatic acid. The proper dose of this latter preparatio from ♏xx to f℥ss., taken diluted with a little water, also directly a meals.

The combination of small doses of muriatic acid is unquestionabl advantage in increasing the digestive power of the stomach. We h hus found the following mixture of much service in the chronic indigestion of children:

℞.—Acid. Muriatic. Diluti, ... gtt. xxv.
Liquor Pepsinæ,
Elix. Calisayæ, āā, ... f℥j.—M.

Dose, from a half teaspoonful to a teaspoonful, according to the age of the child.

In connection with these remedies, a little port wine or brandy, and the former is preferable in children over a few years old, on account of the possibility of their contracting a taste for the brandy, may be allowed twice or three times a day, or at dinner only. To young children, one or two teaspoonfuls of brandy may be given in the course of the day, mixed in water; of the port wine, from a teaspoonful to a tablespoonful, according to the age and strength of the patient, may be repeated morning, noon, and night.

If the bowels are inclined to constipation, they should be kept soluble by laxative enemata, and by the use of rhubarb or aloes; when relaxed, the frequency of the discharges may be controlled by the cretaceous mixture, by anodyne enemata given once or twice a day, by the aromatic syrup of galls (to be described under the head of entero-colitis), or by some of the astringents in common use.

In all cases of chronic indigestion in children, it ought to be regarded as an essential part of the treatment to secure to the patient a proper amount of exercise in the open air. In summer the child should pass several hours of every day in the air. It ought, indeed, if the heat of the sun can be avoided by proper shade, to pass the whole day in this way. In winter it is, of course, impossible to carry this system to the same extent, but the child should nevertheless be taken out at least once a day; this may be done in the coldest, and even in damp weather, if sufficient clothing be worn. If a child comes back from a walk with warm limbs, and with its cheeks in a glow, there is little danger of cold. The quantity of clothing must depend on the constitution and idiosyncrasy of the patient. Some need twice as much as others. The proper amount is best determined by the temperature and coloration of the surface after a walk.

ARTICLE II.

SIMPLE DIARRHŒA.

Under this title we shall describe a mild form of diarrhœa to which children are very subject, in which the pathological condition appears to be one of mere functional disorder, or of very moderate hyperæmia or catarrh of the intestinal mucous membrane. We might, indeed, assume with some, that the disorder is at all times one of mild catarrh of the bowels, but we deem it best, in a practical point of view, to consider it as being sometimes one of functional disturbance only, since many observers of high authority declare that they meet with cas even fatal diarrhœa in which no anatomical alterations are found death, and since we ourselves have met with so many cases in pra which follow a different course in symptomatology, duration, and effects upon the constitution, from the form of disease which we treat of as entero-colitis or inflammatory diarrhœa.

Causes.—The causes of the disease during infancy are *unfavor hygienic conditions*, as the habitation of unwholesome, ill-ventila damp, and filthy dwellings, or of contracted and crowded quarter cities and towns; an *unhealthy state of the milk* of the nurse; the us *artificial diet* at too early an age, especially that of an improper ki *cold; dentition;* and lastly, great *atmospheric heats.* The most im tant of these are improper alimentation, by which we mean the us artificial diet, and particularly one consisting chiefly of farinaceous stances to the exclusion of a proper amount of milk, and dentit For a fuller account of the influence of these different circumstance the digestive organs of children, the reader is referred to the rem on the causes of entero-colitis, and to the article on thrush.

The chief causes of the disease after the first dentition are, accor to our experience: the habitual use of *improper food;* the *loss* of di tive power, which often follows a severe indigestion, or an attac some acute disease; the *debility of constitution* which attends sudden rapid growth; the *want* of proper exercise and exposure to the the predisposition which exists in some children from *hereditary* cau and the disturbing influence of the *second dentition.*

The system of indiscriminate diet allowed to children in this cou is, it seems to us, a fruitful cause of gastric and intestinal compla We believe that, as a general rule, children over two and three y of age, are allowed amongst us to eat of the food prepared for the members of the family. Now, any one who will reflect upon the va of dishes habitually placed upon an American table, ought not t surprised to see children permitted a choice amidst such profusion, thin, delicate, exposed to frequent indigestions, attacks of diarr and entero-colitis, to gastric fevers, and the host of minor ills atten upon feeble digestive powers. We are acquainted with some fam in this city, the children of which, from the age of two years, allowed habitually to breakfast upon hot rolls and butter, hot b wheat cakes, hot Indian cakes, rice cakes, sausages, salt fish, han dried beef, and coffee or tea: and to dine upon a choice of various m and a great variety of vegetables, which latter they often prefer to exclusion of meat, and then to make a rich dessert of pies, puddi preserves, or fruits; and lastly to make an evening meal of tea bread and butter, almost always relished, as the term is, with prese stewed fruits, hot cakes of some kind, or with radishes, cucumber some similar dish. Add to such meals as the above, the eating bet whiles of all kinds of candies and comfits, which many children regularly expect in larger or smaller quantity, cakes both rich plain, fruits to excess and at all hours, from soon after breakfast to

d as a consequence of indigestion. We have known such a re-
occur in children previously in fine health, and to continue for
weeks or months. In these instances, the disorder appears to
in good measure on the loss of the digestive power of the
h. This seems proved by the great influence which the charac-
the food has upon the malady, which is always aggravated by
of any articles except those universally acknowledged to be the
igestible, and also by the frequent coexistence of lientery when
d is not of the lightest kind.

nave several times met with cases which we could ascribe to no
cause than debility and want of power of the digestive organs,
ent upon too rapid growth. That sudden and rapid growth may
e feeble digestion, or, in other words, a dyspeptic state, is, in
nion, proved by the following consideration. It is attended with
appetite, emaciation, paleness, languor, and weakness, and fre-
attacks of diarrhœa, or a chronic form of that disorder; all of
symptoms are greatly influenced by the regimen of the child,
e most readily removed by attention to that point, and by the
tonics and stimulants.

other causes enumerated need but little comment. We will
remark that we have several times observed a predisposition to
ess of the digestive organs, transmitted apparently from parent
d. As to the influence of the second dentition, we have no doubt
is a frequent cause of the complaint, and we believe that it is
le attended to by practitioners.

TOMICAL APPEARANCES.—It has already been stated that we look
his disorder as one of purely functional disturbance in many in-
s. We are led to take this view by the fact that it is so often
nded by any of the ordinary signs of inflammatory action, and
e some very competent observers affirm that they have failed to
a certain proportion of cases of fatal diarrhœa, any lesions ap-

with more or less abundant diarrhœa, and in whom we might expect find colitis, there will be one in whom the gastro-intestinal tube w be found in a state of perfect integrity. They add that this conclusi is deduced from a comparison of nearly three hundred autopsies. W do not find this statement given in their second edition, but we do f there (t. i, p. 693) the following paragraph: "Quite frequently, esp cially in early infancy, in cases in which the symptoms have pointed some disease of the gastro-intestinal tube, an autopsy reveals no lesi of the solids, or only changes of minimum importance. The secretio alone are vitiated." One must suppose, therefore, that the class of cas which we describe as simple diarrhœa, are sometimes quite independe of any anatomical changes in the tissues, recognizable by our ordinar methods of examination, or that those changes are so slight and evanescent as to disappear after death; or that they are those only the mildest forms of catarrhal inflammation. It is not unlikely, seems to us, that further and more minute investigation, especially wi the microscope, will reveal tissue-changes which are not discoverabl by the unassisted senses.

When the anatomical changes, constituting the catarrhal state, a found in children who presented during life the symptoms of simpl diarrhœa, they will be such as are described by Niemeyer in the follo ing passage: "Catarrh rarely affects the entire intestinal canal. It most frequent in the large intestine, less so in the ileum, and rarest the jejunum and duodenum. The anatomical changes left in the cadav by acute catarrh, are sometimes pale, at others dark redness, swellin relaxation, and friability of the mucous membrane, which is sometim diffuse, at others limited to the vicinity of the solitary glands and Peyer's patches, and a serous infiltration of the submucous tissue. O casionally, after death, the injection has entirely disappeared, and th mucous membrane appears pale and bloodless. Swelling of the solitar glands and glands of Peyer is an almost constant appearance; the distinctly project above the surface of the mucous membrane. Th mesenteric glands also are usually found hyperæmic and somewhat e larged. The contents of the intestines consist at first of plentiful sero fluid, mixed with detached epithelial and young cells, subsequently a cloudy mucus, which is adherent to the wall of the intestine, an contains epithelial structures."

The best description that we are acquainted with of the anatomic appearances found in the intestines in fatal cases of diarrhœa, not i children, to be sure, but in adults, is that given by Dr. Woodwar in his work on *Camp Diseases* (Philadelphia, 1863). In that wor (page 216), under the head of simple diarrhœa, he says that this fo of diarrhœa is to be regarded as usually the result of irritation of th intestinal mucous membrane, produced by the ingestion of improp food, or other causes mentioned, and expressing itself in increas secretion throughout the intestinal tract. The irritation, he goes to say, may even amount to inflammation. Opportunities for po mortem examination occur but rarely. "They reveal little that be

and leading to similar forms of disease.
PTOMS.—We shall describe first the symptoms of simple diarrhœa
nts, and afterwards those which characterize the disorder in older
en. In infants the appearance of the diarrhœa is usually pre-
or accompanied by slight disturbance of the *temper* and *comfort* of
ild. There is some degree of *restlessness*, *peevishness*, and disposi-
cry; the child sleeps less than usual, and often starts and moans
sleep; all of which symptoms are more marked, as is the case
in nearly all the ailments of children, during the night. Though
mptoms described are observed from time to time, and particu-
during the night, they are not always present, as the infant will
onally through the day seem perfectly well and comfortable,
the exception, perhaps, of slight paleness and languor, almost
s perceptible upon its countenance. There is no *fever* in these
or at least nothing more than unusual warmth of the hands,
nd abdomen at night. If a marked febrile reaction take place,
would be reason to suspect the existence of some degree of
-colitis. The *mouth* often becomes, after a few days, a little
er and less moist than usual; the *tongue* is generally moist and only
ly coated; and the *appetite* is commonly diminished, as shown by
ild's nursing with less eagerness and at longer intervals than be-
In very mild cases the *stools* are at first, and sometimes throughout
tack, feculent; the only differences from their ordinary characters
at they are more frequent, thinner, more copious than usual, and
he odor is changed so as to become acrid and offensive. In severe
they contain less feculent matter, become yet more fluid and
imes watery, and exhibit small particles of a greenish color
red through them; or the whole of the discharge is of a deep green
and it is intermixed with portions of mucus. In many of the
whitish lumps, evidently consisting of undigested curd, are

and the flesh of the child becomes softer and more relaxed than be the attack. The *duration* of the disorder is generally short, as it dom lasts more than three or four days or a week. It may termin in complete restoration to health, without having exposed the life of child to danger, or, if the causes which gave rise to it continue in acti if the child is of delicate constitution or the treatment not correct, a especially if this is of too perturbating a character, it is very apt to r into entero-colitis and expose the patient to all the dangers of that ease.

In older children (after the first dentition), the disease is much l frequent than in infants, and presents a different train of sympto Often it is nothing more than a slight disorder of the bowels, amou ing to three, four, or five stools, thinner and more abundant than usu accompanied by slight colicky pains, and unattended by fever or oth signs of sickness, which, after continuing one, two, or three da ceases, and the child regains its usual health. Some children are p ticularly liable to these attacks, and suffer from them every few wee or after any indiscretion in diet; whilst in others they are rare, let diet be what it may.

There is another form of simple diarrhœa, however, of which we ha seen a number of cases, much more troublesome than the one just scribed. It occurs in children from two and a half to seven and eig years of age, lasts a considerably longer time, and is much less und the control of remedial measures. This form of the disease has nev in the cases that we have seen, been accompanied by fever, or by a constitutional symptoms rendering it necessary to confine the chi either to the bed or house. The only symptoms besides the diarrh which we have observed, have been some degree of paleness and mo erate emaciation; slight weakness, shown by an indisposition on part of the child to play with its usual spirit, by an inclination to about from time to time through the day on the sofa or floor, and complaints of "being tired;" irritability of temper and peevishne irregular appetite; picking of the nose; and restless, disturbed sleep night, attended with moaning, crying, starting, and grinding of t teeth; all of which symptoms generally convince the mother that child is suffering from worms. The abdomen is sometimes slight tumid, but remains natural as to tension, and is not painful on pr sure. There is no pain except slight colic in some cases. The sto have generally numbered from three to five, and in a few cases many as six or eight a day. They are semifluid in consistence, of of a very offensive odor, and consist usually of feculent matter, whi is sometimes clay-colored, more frequently dark brown, and, in oth instances, deep yellow or orange in color. They are often also of frothy character. In some of the cases that we have seen, there w lientery whenever the aliment was otherwise than of the lightest a most digestible kind. In all, the diarrhœa was evidently greatly fluenced by the diet, showing, it appeared to us, a manifest dependen

e malady upon the condition of the stomach, which seemed to
lost to a great degree its digestive power.

e *course* of the disease in this form is variable. In some it lasts a
weeks, and then, under the influence of diet and remedies, ceases,
cur and run the same course after a short period. In others it may
a much longer time in spite of all treatment that we attempted.
have known it to thus continue between three and four months,
occasional slight remissions, brought about apparently by remedies
ch a day or two after would lose their effect.

AGNOSIS.—The diagnosis of simple diarrhœa will rarely present
difficulties, since there is nothing with which it could be con-
ded, except the diarrhœa from tubercular ulceration of the bowels, or
ro-colitis. From the former it is to be distinguished by the history
e case, and by the signs of tuberculosis in other parts of the econ-
; from the latter, by the absence of signs of inflammatory action.

OGNOSIS.—The prognosis is favorable so long as the disease remains
le. The physician should never forget, however, the disposition
ch is inherent in it to pass into entero-colitis, nor fail to make the
ible occurrence of this transition one element in his prognosis.
ing infancy it is always more serious than after that period, from
feebler power of resistance on the part of the constitution at that
to disease, which undoubtedly allows this simple affection to prove
in some instances, probably from the shock to the nervous system.
r infancy it is rarely a dangerous disorder, both because of the
ter stamina existing at that age, and from the fact that the dispo-
n to the extension of disease is less strong.

EATMENT.—The *prophylactic management* of simple diarrhœa is the
as that which is proper for entero-colitis, and as that affection
be treated of at considerable length in a future article, we must on
unt of our limited space, refer the reader there for information on
point.

fter the disease is established, the treatment must consist first in
ntion to the *diet*, *exercise*, and state of the *gums* of the child. In
y cases, careful regulation of the diet and exercise, and lancing the
s when they are much distended and vascular from the pressure of
advancing teeth, will suffice to arrest the disorder in a few days,
out the necessity of resorting to drugs, which ought certainly to
avoided whenever it is possible to do so. If the child is at the
st, we must ascertain whether the milk of the nurse is good, by
iry as to its appearance, specific gravity, reaction, and by exami-
on with the microscope, and by reference to her health, diet, tem-
&c., all of which circumstances more or less affect the mammary
etion. If we conclude that the milk is good, or that it has been
rbed in its healthy properties only by a transient cause, the child
t be continued at the breast, with the precaution, however, of not
ing it to nurse quite so much as usual. An infant suffering from
kind of diarrhœa, had better be restricted entirely to the breast,
ss it be clear that the supply of milk is quite insufficient. If we

determine that the milk is unhealthy, the nurse must either be chang or the child weaned; of course the former alternative is infinit preferable if the child is under a year old, or even under eight months, if it seem to have a rather delicate constitution.

If the case occur in a child already weaned, or in one fed partly artificial diet, the regulation of the kind, preparation, and quantity aliment is of the utmost consequence. It ought to consist chiefly milk or cream weakened with water, unless it has been clearly sho by previous trial that these articles do not agree with the child. prefer before any kind of diet that we have ever employed, or kno to be employed, that made from cow's milk, cream, arrowroot, and g atin, in the manner described at page 338. The proportions of t milk, cream, and arrowroot must vary with the age and digesti power of the patient. As a general principle, during the existence diarrhœa, or at least in the early stage of it, and before the streng has been reduced by the disorder, the proportions of cream and mi ought to be somewhat less than in health. Not only so, but the to quantity of food in the day should be diminished, unless the ordina amount seems to be really necessary for the sustentation of the streng If it be found, after patient trial, that the child will not take, or do not digest this kind of food, we may try arrowroot or rice-water, wi a little cream, or thin gruel or panada, alternated with very carefu prepared chicken- or mutton-water. If the child is six or eig months old, it often suits well to allow it a piece of juicy beef or chicken-bone to suck, or from one to several teaspoonfuls of meat chicken or mutton minced very fine.

For older children with a common attack of simple diarrhœa, t diet should consist for a few days of boiled milk with bread, of gru made of boiled milk and arrowroot, rice-flour, sago, tapioca, or comm wheat flour, and of small quantities of light broths. Meats are, for t time, improper, and all vegetables, with the exception of rice, yet wor

In the case of infants it is best to recommend a continuation of t ordinary exercise, unless the weather be cold and damp. Indeed, good weather, exposure to the air and proper insolation are more i portant during the existence of this disorder than even during heal The same remarks apply to older children, with the exception th they ought not to be allowed to fatigue themselves, particularly warm weather, as this tends to aggravate the complaint.

When the disorder occurs in a teething child, the gums oug always to be examined by the physician, and if found swelled, vascul of a deep red color, and hot, with the outline of the advancing too perceptible, they should be freely incised to the tooth. If, on the co trary, the tooth is too deep to be felt, and yet the gum is red a swelled, we would advise only a slight and superficial scarification order to relieve the tension.

The *therapeutical management* of the disease should be as simple possible. The fewer drugs we can succeed with in the gastro-intesti complaints of infants and children, the better. When, however, t

ontinues for some days in spite of attention to the points
ntioned, and earlier if the discharges are either large, fre-
watery, or weakening to the child, we must resort to some
ns which have been found most useful in checking the inor-
ion of the bowels. The most important are a careful em-
of laxatives, and the use of opiates and astringents. For-
generally commenced the treatment by the exhibition of a
l of castor oil, containing from half a drop to a drop of
for young infants, and two drops for older children : but of
we have usually preferred the spiced syrup of rhubarb, in a
ul dose, with laudanum, as above recommended. Castor oil
s purges more than we like; rhubarb rarely does so. These
n for two evenings in succession have oftentimes sufficed to
cure. Dr. West recommends very highly in cases of simple
, in which the evacuations, though watery, are fecal, and con-
mucus and no blood, small doses of the sulphate of magnesia
ure of rhubarb. His formula at one year of age is as follows:

℞.—Magnes. Sulphat., ... ʒj.
Tinct. Rhei, ... fʒij.
Syr. Zingiber., ... fʒj.
Aquæ Carui, ... fʒix.—M.
Dose, a teaspoonful.

ften use with excellent effect the sulphate of magnesia, with
m, as follows:

.—Magnes. Sulphat , ... ʒj.
Tr. Opii Deodorat., ... gtt. xij.
Syrup. Simp., ... f℥ss.
Aquæ Menth. vel Cinnamom., ... f℥ijss.—M.

st one or two years a teaspoonful every two or three hours. For older chil-
e proportion of the magnesia and laudanum should be doubled.

e diarrhœa persists after these means have been used for two or
days, or gets rapidly worse, we must resort to some of the astrin-
The one most commonly employed is the chalk mixture, which
inal in our Pharmacopœia. A teaspoonful of this is to be given
ach loose evacuation, or three or four times a day. If the case
obstinate, it will be found useful to add to each dose of the chalk
ation, a small quantity of laudanum or paregoric, or some astrin-
incture, the best of which is the tincture of krameria. When
alk mixture fails entirely, powdered crab's-eyes will sometimes
d; or we may resort to the aromatic syrup of nutgalls. The for-
and doses for both these remedies will be found in the article on
-colitis. If the discharges are small and frequent, mixed with
and somewhat painful, it will be found that small opiate injec-
(from one to two drops of laudanum in a tablespoonful of starch-
for young infants, and from three to six drops in double that
ity for older children), or the use of Dover's powder in combina-

tion with chalk or sugar of lead, will often succeed in arresting the disease. One of the most valuable astringents in the bowel affections of young children is bismuth, which we are much in the habit of giving in the form of subnitrate in doses of from two to five grains, according to the age, from three to six times in the course of twenty-four hours. For further and more complete information in regard to astringents, we must refer the reader to the article on entero-colitis, where they will be fully discussed.

The chronic form of simple diarrhœa which we have attempted to describe, occurring in children who have completed the first dentition, has always proved difficult to manage. From the experience we have had, we believe that the best mode of treating it is by proper regulation of the diet, and by the use of tonics and stimulants, and occasionally of opiates. We were led to adopt this plan in consequence of having failed entirely to control the symptoms by the treatment generally successful in simple diarrhœa, and by the opinion which we came at last to form, that the disease depended in great part on a loss of the digestive power of the stomach and duodenum. The diet must be adapted to the idiosyncrasies of the individual; what we should seek is such a one as will be easily digested by the patient, the materials of which shall not appear in the stools, and one which does not manifestly increase, if it fail to moderate, the frequency of the discharges. The one which we have found to succeed best, consists of boiled milk with stale bread for breakfast and tea, and the tenderest meats, as very fine beef, mutton, chicken, or birds, with rice, as the only vegetable, for dinner. If the child likes flour or rice pap, it may have either in place of the bread and milk. If it will take none of these, it may have milk, warm water and sugar, with bread; or well-boiled mush with milk, or milk toast. Should it refuse the dinner recommended above, we may substitute delicate soup, or some of the milk preparations. Raw meat, given in the manner recommended in the article on entero-colitis, should also be tried, and will at times prove very beneficial. Between meals it ought to be allowed nothing but dry bread. All rich food, dessert, fruits, all vegetables except rice, candies and comfits, all kinds of cake and hot bread, in fact everything except the articles which we have mentioned, or similar ones, ought to be rigidly, systematically, and perseveringly forbidden. Until this has been done for many days, or for several weeks, the disease has always, according to our experience, obstinately persisted.

We have already said that we have not found the ordinary remedies for simple diarrhœa to exert much effect upon this form of the disease. On the contrary, the treatment for dyspepsia, that is to say, a simple but nutritious diet, exercise, and the use of tonics and stimulants, has always removed it in a longer or shorter time. The tonics which we have employed are port wine, quinine, and iron. From a dessert to a tablespoonful of port wine was usually given in water three times a day, in connection with iron. The preparations of iron used were Vallet's mass, of which from half a grain to a grain was given in pill three s a day ; the solution of iodide of iron in the dose of first one, and from two to four drops, three times a day, or the solution of the te of iron in the dose of from two to five drops, three times a day, ater, continued for one or two months. We have sometimes com-d with each dose of the solution of iron a drop of laudanum, especi-if there were pain ; or the opiate might be given by injection every ing. The quinine was generally administered alone in the dose of ain three times a day, for one, two, or three weeks. It has not, ever, proved so useful as port wine and iron.

nother tonic which we have found very useful in some cases of this , of late years, is one containing nux vomica and compound tinc-of gentian, as follows :

℞.—Tr. Nucis Vomic.,	fʒss.
Tr. Gentian Comp.,	fʒiij.
Syrup. Simp.,	fʒv.
Aquæ,	f℥ij.—M.

e, a teaspoonful three times a day after meals, for children of three or four of age.

ine of pepsin, in half teaspoonful doses, three times a day, is also od remedy in such cases, or we may use the powdered saccharated in, in doses of two to five grains, taken soon after each meal.

the case attended with all the symptoms usually thought to indi-worms, the use of wormseed oil was followed by the expulsion of ral very large lumbricoides. The child did not recover, however, ome weeks afterwards, and not until he had taken port wine and ine for a considerable period. In other cases in which the vermin-ymptoms were also strongly marked, and in which the same rem-was given, no worms were expelled.

SECTION II.

ASES OF THE STOMACH AND INTESTINES, ATTENDED WITH APPRECIABLE ANATOMICAL LESIONS.

ARTICLE I.

GASTRITIS.

ASTRITIS, in the sense in which the term was used some ten or ty years since, viz., to express an individual and special inflam-ory disease of the stomach, of common occurrence and of supposed t severity and importance in childhood, is now well known to be a affection. It is doubtful, indeed, whether it ever forms a special of childhood, which result from the use of improper artificial infants, and of crude and indigestible articles of food in older c

We had almost abandoned the plan followed in our former edi devoting a special chapter to this subject, but, on further consid think it will be best to treat of it separately, since, as stated cases do occur in practice in which the stomach is the chief, if only seat of disease, and which can be properly designated and d only under the title of gastritis.

Causes.—It has already been stated that the most violent a cal cases of gastritis, as a distinct disease, are the result of t cation to the organ of some special irritant, as the miner arsenic, boiling water, or of certain remedial agents, and part of tartar emetic, kermes mineral, or croton oil. These latter the drugs just mentioned, cannot produce this effect unless used doses, or when continued for too long a time. The quantitie antimonial preparations formerly administered, were always th us to be dangerously large, and we were not at all surprised to f MM. Rilliet and Barthez, from their experience in former yea Children's Hospital in Paris, cited them as one of the causes gastritis. In the *Journal für Kinderkrankheiten*, for the yea 1860, and 1861, in the third, fourth, and fifth annual report Public Institute for Children's Diseases, of Vienna, by the Dr. Luzsinsky, may be found in the third report three cases fourth three cases, and in the fifth two cases of gastritis cause accidental drinking of concentrated lye.

The milder forms of gastritis are vastly more common than above referred to. They are generally associated with disturb the intestinal tube also, and constitute by far the majority of t which come under the observation of the physician. They ar very generally by improper alimentation; by the same causes, as those which determine indigestion. In infants, an unhealt r less severe form of the disease we are considering.

TOMICAL APPEARANCES.—Death is so rare a consequence of gas-
lone, except in the form produced by the direct application of
ts to the organ (and even in such, recovery appears to be the
nce all the eight cases referred to as reported by Dr. Luzsinsky,
red), that it is difficult to present a description of the lesions
teristic of this variety of the disease. M. Billard, however
les Enfants, p. 353), gives a case from M. Denis, and one observed
nself. M. Denis found the mucous membrane of a deep brown
of a fetid odor, reduced here and there to a state of putrilage,
erywhere easily removed in softened strips. A fluid of the color
s of wine, was found macerating the changed mucous membrane,
is he could ascribe only to gangrene from excessive inflammatory
. The case observed by Billard occurred in a girl three days old,
as brought to the infirmary with a quantity of blackish blood
l into the napkins, and also vomited. The child died on the fol-
g day. The mouth and œsophagus were healthy, but the mucous
rane of the stomach was completely destroyed, not far from the
c orifice, over a space as large as a thirty sous piece. The centre
s space was stained with blackish blood, and its edges, irregularly
d, were blackened and looked as though they had been burned.
le of this dark circle, the mucous membrane was thickened, of a
-red color, and easily reduced to a pulp. The whole surface of
rgan was lined with semifluid matters, of a bistre color, mixed
sanguinolent striæ, and the mucous membrane beneath these
rs was very thin and discolored, especially near the pylorus.
mall intestine was stained yellow with bile, and contained frag-
s of coagulated blood. The large intestine was healthy. The
was bloodless and pale; the spleen small and but slightly injected.
ne is given as to the cause of this grave lesion.

acute gastric catarrh in post-mortem examinations; when we do, the gastric mucous membrane is found reddened in spots by a fine injection; its tissue is relaxed, and its surface covered with a layer of tough mucus. But more frequently, especially among children who die with the symptoms of cholera infantum, the autopsy gives negative results, except as to appearances which will be described hereafter. This does not appear strange when we remember that the capillary hyperæmias of other mucous membranes, which we have been able to observe directly during life, leave no trace after death, and that a relaxation and partial loss of epithelium, which we have regarded as the most probable cause of the extensive transudation in cholera infantum, may be very readily overlooked in the dead body, and can very rarely be observed with certainty."

The description of the anatomical appearances in gastritis will not be complete without some reference to a lesion which, some ten or twenty years since, was thought to be one of great importance in children. This lesion, known by the names of softening or gastro-malacia, was supposed by some to constitute a distinct pathological entity, and to be the result in most cases of inflammatory tissue-changes determined by many different causes. Even then, however, not a few observers believed that the lesion was a post-mortem change, and not the consequence of changes caused by disease during life. This latter opinion has continually gained ground, until now it is generally believed that, when present in a marked degree, it is in fact a cadaveric change. Niemeyer (*op. cit.*, vol. i, p. 476) says that the gastro-malacia or softening of the walls of the stomach, found on autopsy in children, is always a post-mortem appearance, and that "if a child dies who has had vomiting and purging from abnormal fermentation in the stomach, and if there are still fermenting substances left there, the fermentation will not be arrested by the gradual cooling of the body. When the circulation ceases, the stomach can no longer resist the decomposition, which then extends to it also, just as the stomach that has been cut out of an animal and filled with milk, softens if left only for a short time in a warm place. Hence physicians who consider softening of the stomach as a post-mortem appearance, may also predict it with certainty when a child that has died of cholera infantum had eaten milk, or any other easily decomposed substance, shortly before death."

That a certain degree and kind of softening does, however, attend upon catarrhal inflammation of the gastric mucous membrane, as a result of faulty nutrition of the tissues during life, is probably quite as true as that the extensive white softening of one or more of the coats of the organ, not unfrequently met with, is the consequence of a post-mortem change. Thus Dr. Wilson Fox (*loc. cit.*, p. 858) asserts, that the softening of the mucous membrane which accompanies acute catarrh is totally distinct from the post-mortem softenings, which are distinguished by the transparency of the tissues. "It rarely exists," he says, "to any marked degree, except in extreme cases, but there is always a certain diminution of resistance to the finger-nail or to the l, which materially assists, when conjoined with opacity and ning, in distinguishing this condition. Louis's test of the extent ich it can be torn from the submucous tissue is a less available nd applies rather to the states of post-mortem solution than to ondition."

IPTOMS.—It is very difficult to give an accurate account of the toms of inflammation of the stomach, for the following reasons: have not as yet been studied with a sufficient degree of care; gas-is, as was stated in the early portion of this article, rarely idio-:, but almost always a secondary affection in the course of other lies; the symptoms which betray it resemble so closely those of inal diseases, as to make it very difficult, if not impossible, to draw inction between the two; and lastly, in the great majority of cases, ic complaints coexist with intestinal.

e most important symptoms are vomiting, diarrhœa, loss of appe-hirst, epigastric tenderness, sometimes tension of the abdomen, light febrile reaction.

miting is the most important of the different symptoms of gastritis. not, however, according to MM. Rilliet and Barthez, invariably nt. It was observed by them particularly in cases following the nistration of active remedies, while in those which occurred spon-usly, it was much less common. It shows itself especially after aking of food or drink. Sometimes when the stomach is empty, is simply nausea and retching. In severe cases the vomiting is ent, and accompanied by violent straining and pain. *Diarrhœa* in most cases, whether the attack be one of simple gastritis, or npanied with enteritis. The *appetite* is generally lost or greatly ished. *Thirst* is commonly acute, and often intense. The *tongue* scribed by some writers as being generally red, and sometimes th and glazed. The authors above quoted, state, on the contrary, it presents nothing peculiar in most cases. It was generally moist, slightly colored, covered with a white or yellow coat of variable ness, and in some rare instances, red on the edges and tip, or gluey, en dry and harsh. As a general rule, the *abdomen* is normal, ac-ng to the same authors, though in some cases there is more or less ing and tension. According to most writers there is generally erness on pressure in the epigastrium. Infants and young children ommonly restless and uneasy, as though in more or less pain, while who are older complain of burning in the region of the stomach. well to remark that MM. Rilliet and Barthez state that tenderness ressure often exists, not at the epigastrium, but in one of the iliac , or at the umbilicus, even when the stomach alone is inflamed. condition of the circulation, and indeed all the symptoms, depend uch upon the nature of the concomitant malady, that it is difficult certain what are their real characters in simple gastritis. Most rs agree that *fever* usually accompanies the disease, and that it is nonly of the remittent type. It is certain, however, from other vations, that it is not always present.

In very violent cases there are added to the symptoms just described those indicative of an adynamic state of the nervous system: prostration, cool or cold skin, with perspiration; weak, rapid pulse; singultus; sometimes convulsions, and death. The symptoms which have just been detailed as indicating the presence of gastritis, do not generally exist alone. They are much more frequently than not associated with other symptoms, which show the presence of intestinal disease in the form either of simple or inflammatory diarrhœa. That they do sometimes, however, exist alone, and that, too, independently of the action of irritating drugs, or of corrosive poisons, we cannot ourselves doubt, since we have several times seen them follow attacks of simple indigestion. In such cases, we have met with all the symptoms usually supposed to indicate an inflamed state of the gastric mucous membrane,—repeated and obstinate vomiting, epigastric tenderness, entire loss of appetite, and more or less acute fever. We have, to be sure, never seen a post-mortem examination of such a case, for we have never yet known one to prove fatal. Whether we call such an attack gastritis, acute catarrh of the stomach, or *embarras gastrique*, matters not much. It is the condition which has long been looked upon as indicating an inflammatory state of the gastric mucous membrane, and until we have more positive evidence than has yet been adduced, that inflammation has nothing to do with it, we shall deem it best to retain the old title.

DIAGNOSIS AND PROGNOSIS.—The *diagnosis* must rest chiefly on the existence and frequency of vomiting, on the presence of epigastric pain or tenderness, of swelling and tension of the abdomen and excessive thirst, and on the absence of other disease which might account for the illness of the child.

The *prognosis* will depend on the severity of the gastric and constitutional symptoms, and on that of the concomitant disease, when the attack is secondary. When there is incessant and obstinate vomiting, so that not even water in small quantities can be retained after several hours of sickness, when the tongue is red and glazed, or dry and brown, and when adynamic symptoms make their appearance, and emaciation makes rapid progress, it is much to be feared that extensive organic change has taken place, and that the case will prove fatal.

TREATMENT.—The two most important points in the treatment are the withdrawal of the causes that may have produced, or may tend to keep up the disease, if these can be detected, and strict attention to diet. Whenever, therefore, the symptoms have made their appearance after the exhibition of powerful drugs, as tartar emetic, kermes mineral, or cathartics, their use ought to be instantly suspended. The child should be put on the strictest diet. If at the breast, it must be allowed to nurse only at rare intervals, and to take but little at a time. If fed on artificial diet, it should be restricted to barley- or arrowroot-water, to very weak milk and water, or to small quantities of milk diluted with lime-water, in the proportion of a third or a half of the latter. This is one of Dr. Chambers's favorite prescriptions, and is an admirable one.

ing solid and no rich liquid nourishment ought to be allowed, unless hild is in a state of weakness and debility from previous or con- tant disease, such as to make it absolutely necessary to endeavor aintain its strength. Billard even recommends that the child be ined by means of nutritive enemata, while the digestive function is ed a total rest.

tiphlogistics are useful and proper when the disease occurs in a g and healthy child, when it is associated with fever, and when is nothing in the nature of the accompanying disease, if it be a dary case, to prevent their employment. The most suitable mode pletion is by leeches, which should be applied to the epigastrium. best to take but a very moderate quantity of blood, for fear of usting the patient. After the use of the antiphlogistic remedy, a n bath will be found of great service in moderating the heat of the and rendering the child more comfortable. Small pieces of ice t to be put into the mouth occasionally as a refrigerant, or small tities of iced drinks may be allowed from time to time. As soon e bleeding from the leech-bites, if leeches have been employed, has ed, a warm light mush poultice to the epigastrium is a valuable and l remedy. Some writers recommend the use of blisters to the epi- rium. We should much prefer a warm poultice or the occasional ication of a mustard poultice. *Opiates* are useful in allaying nausea vomiting, and appear to exert a favorable influence on the progress e disease.

hen vomiting is frequent and troublesome, it may generally be ed by the administration of lime-water and milk, given in tea- nful quantities every fifteen minutes or half hour; by observing precaution of allowing the food and drink to be given only in the llest quantities (from a teaspoonful to a tablespoonful) and at con- rable intervals; by the application of warm cataplasms over the men, or a spice-plaster to the epigastrium; or, lastly, by the exhi- n of a few drops of laudanum or paregoric, to be repeated if neces- . If the child becomes weak and exhausted, with coolness and dant moisture upon the limbs, we must resort to the administra- of some kind of stimulant. The best is weak brandy and water, n in very small quantities; or we may employ wine-whey, or milk ch, or the aromatic spirit of hartshorn.

ARTICLE II.

ENTERO-COLITIS OR INFLAMMATORY DIARRHŒA.

EFINITION; FREQUENCY.—By entero-colitis or inflammatory diar- a, we mean that form of diarrhœa which presents, during life, in le reaction at some period of its course, in marked constitutional urbances, and in the mucous, muco-purulent, or muco-sanguineous stools, the proofs of inflammatory changes in the intestinal mucous membrane; and which exhibits, after death, the tissue-changes in the small and large intestines which are regarded as the products of inflammation of those organs.

The disease is one of the most common and one of the most fatal of childhood. Few young children die in the foundling hospitals abroad, or in the hospitals and almshouses of this country, from insufficient or improper food, but die of this affection. Many, a large majority, we think, of the deaths accredited to cholera infantum belong to this disorder. The true choleraic disease is constantly passed through with safety, but is followed by a long, obstinate, exhausting diarrhœa, which is in truth an inflammatory diarrhœa occurring as a sequel to cholera.

A large proportion of the cases of summer diarrhœa are, from the beginning, cases of this kind; or they commence as merely functional disturbances of the intestine, and run, sooner or later, into the disorder we are now considering. It is one of the most important diseases of young children, especially in this country, where our long summer heats, and the filthy condition of many parts of some of our most famous cities, give it a degree of prevalence and fatality which raise it to the rank almost of a pestilence.

We believe that most of the cases of diarrhœa in children, no matter what may have been the exciting cause at the start; whether a constantly improper diet, as in hand-fed children; whether ill-judged experiments in new foods by the mother or nurse; whether the accidental use of unwholesome food; whether summer heats, exposure to unhealthy and foul exhalations, crowding, malarial or epidemic causes, dentition, residence in cities, or what not, are prone to end, are nearly certain to end, if they become chronic, in this disease. This opinion is the result of our experience in private practice, in this city, during thirty years. It is curious, too, and it is confirmatory of the correctness of this opinion, that in our armies during the late war, diarrhœa, whenever it became chronic, exhibited lesions which are best indicated by the term entero-colitis, if we are to use a name based upon the anatomical lesions of the disorder.

Entero-colitis, then, is undoubtedly, one of the most frequent of children's diseases, though it is impossible to determine accurately the mortality it occasions in this city, from the returns as at present made by our physicians.

Thus during the seven years (1862–1868 inclusive) there were 7273 deaths under five years of age in this city, from the three diseases, cholera infantum, diarrhœa, and dysentery (not to include a comparatively small number returned as due to colic, marasmus, inflammation of the stomach and bowels, aphthæ, &c.). Of these, as will be seen by inspection of the accompanying table[1] (see p. 386), by far the greater portion, namely 5963, are recorded as due to cholera infantum. r extended opportunities of observing the diseases of children in s city have, however, led us to the conviction already expressed in e remarks which preface this article, that the great majority of these ses should in reality be entitled entero-colitis, while the true choleraic isease, to which alone the term cholera infantum should be restricted, s a comparatively infrequent affection.

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[1] We are indebted to the courtesy of Mr. Chambers, the clerk of the Board of Health in this city, for the opportunity of collating portions of this table from the monthly returns of mortality calculated by him.

We may appreciate yet more accurately the importance and frequency of the disease, by reference to the statements of MM. Rilliet and Barthez, who say (1ère édit., t. i, p. 483), that, taking into consideration all the cases they observed, including tubercular cases, they find that of every two children that die, one presents a more or less serious lesion of the large intestine. They add: "If it be recollected that this holds true particularly in regard to younger children, it will be seen that it is rare for a child to die between two and five years of age, without having either colitis or softening of the large intestine." Bouchut states that entero-colitis is one of the most dangerous affections of children at the breast: "It is the most common of all those incident to that age" (p. 210).

We shall describe two forms of the disease, the *acute* and *chronic*. The acute form is accompanied by active and inflammatory symptoms from the first, and runs its course in a few days or weeks; the chronic form is unaccompanied by acute symptoms, and lasts several weeks or months.

CAUSES.—The two most important causes of this disease amongst us, are improper alimentation and the heats of summer. The improper alimentation consists in an unhealthy state of the nurse's milk, or, what is much more common, of some improper kind of artificial nutriment; of the latter, the kind of food most apt to produce the effect, is one composed exclusively or in considerable proportion of some of the feculent substances, which constitute so large a portion of the diet of children throughout the civilized world. To prove the truth of this assertion it is only necessary to quote the opinions of those who have most carefully studied the subject. M. Valleix (*Guide du Méd. Prat.*, t. iv, p. 60, 61, and *Bulletin Gén. de Therap.*, article Acute Enteritis of Adults and New-born Children, March, 1845), clearly asserts that the most frequent cause of muguet, which he believes to be essentially connected with enteritis, is a too exclusively feculent alimentation. In the article last cited, while speaking of the great importance of this cause, he says: "What proves that my assertion is not hypothetical is, first, that all the deaths from enteritis in children that I have seen occurred in those who had been placed upon this kind of regimen, and second, that the disease did not occur in any of those observed by me in private practice, for whom I had directed an exclusively milk diet up to four, five, or six months of age." He adds that M. Trousseau had arrived at similar opinions, after studying the same diseases at the Necker Hospital; and that he, on account of the danger

TABLE SHOWING THE MONTHLY MORTALITY FOR THE LAST SEVEN YEA
YEARS OF LIFE; COMPARED WITH THE TOTAL MONTHLY MO

MONTH.	1862.			1863.			1864.			186	
	MORTALITY.			MORTALITY.			MORTALITY.			MORTALITY	
	Cholera Infant. Dysent. Diarrh.	Total.	Mean Temperature.	Cholera Infant. Dysent. Diarrh.	Total.	Mean Temperature.	Cholera Infant. Dysent. Diarrh.	Total.	Mean Temperature.	Cholera Infant. Dysent. Diarrh.	Total
Jan.	1 2 4	1314	32.46°	0 3 3	1061	38.25°	1 0 5	1302	33.28°	1 6 3	1272
Feb.,	1 3 1	1080	32.70°	5 3 2	1122	35°	0 3 0	1434	35.97°	2 2 1	1550
March,	2 2 3	1204	40.25°	0 2 7	1172	37.26°	4 1 5	1894	40.5°	3 1 2	1808
April,	3 1 4	1213	50.61°	2 5 6	1488	49.80°	2 2 6	1377	50.58°	5 3 4	1411
May,	9 4 5	1343	63.70°	5 1 6	1060	64.63°	10 5 8	1529	67.20°	10 6 7	1227
June,	20 3 8	1002	69.14°	14 2 5	961	68.76°	74 11 14	1245	72°	184 10 20	1690
July,	300 21 31	1767	75.23°	313 17 38	1859	77.07°	259 24 32	1643	76.08°	364 52 41	1838
Aug.,	217 19 22	1755	76.70°	464 25 28	2044	79.46°	250 27 31	1956	79.40°	245 42 23	1759
Sept.,	60 4 9	1037	69.36°	105 15 9	1453	64.73°	28 16 10	1251	65.	44 14 7	1040
Oct.,	15 5 4	1235	58.32°	14 4 5	1104	56.08°	9 8 4	1144	54.75°	15 12 5	1084
Nov.,	0 2 5	1021	45.20°	5 0 1	1061	47.72°	2 2 1	1212	45.80°	9 8 3	1285
Dec.,	0 1 2	1124	36.06°	3 2 1	1404	35.41°	2 2 4	1595	36.77°	0 2 3	104
Total,	803			1120			862			1139	

NFANTUM, DYSENTERY, AND DIARRHŒA, DURING THE FIRST FIVE CAUSES, AND THE MEAN MONTHLY TEMPERATURE.

	1867.			1868.					
	MORTALITY.			MORTALITY.					
Mean Temperature.	Cholera Infant. Dysent. Diarrh.	Total.	Mean Temperature.	Cholera Infant. Dysent. Diarrh.	Total.	Mean Temperature.	Mean Mortality for Seven Years from Cholera Infantum, Dysentery, and Diarrhœa.	Mean Total Mortality for Seven Years.	Mean Temperature for Seven Years.
29.31°	3 0 4	1376	25.89°	2 2 1	1249	30.12°	7 1/7 2 3 3/7	1296 4/7	30.87°
34.14°	3 2 3	1042	40.21°	0 0 0	1063	26.65°	1 5/7 2 1/7 1	1206 5/7	33.89°
40.85°	3 1 2	1094	38°	1 1 1	1096	41.12°	2 3/7 1 1/7 3 2/7	1844 4/7	40 85°
56.06°	1 2 0	1088	54.13°	9 5 2	1357	48.24°	4 3 3 5/7	1281 1/7	52.27°
61.37°	7 2 3	1260	59.44°	4 1 6	917	59.66°	7 4/7 2 6/7 4 3/7	1284 2/7	62.77°
73.04°	38 6 5	980	72.19°	71 8 7	1201	71.99°	67 6 9 6/7	1178 1/7	71.97°
80.37°	423 23 31	1795	76.48°	423 14 32	1900	80.94°	358 3/7 24 3/7 34 1/7	1837	77.71°
72.5°	265 26 25	1294	75.10°	327 19 34	1570	78.42°	304 6/7 27 2/7 29 1/7	1825 3/7	76.62°
69.42°	88 13 9	1012	68.21°	128 14 24	1353	68.80°	77 3/7 13 11 4/7	1215 3/7	68.31°
58.35°	24 0 10	1177	57.65°	20 2 3	955	54.08°	152 4 6/7 6 4/7	1218 1/7	56.8°
48°	6 2 5	871	47.79°	3 2 0	878	46.91°	31 2 4/7 2 5/7	1052 1/7	46.68°
33.63°	1 2 2	974	31.78°	1 0 3	1154	32.16°	9 1 4/7 2 1/7	1191	34.7°
	1040			1057					

partly nursed. Children fed wholly on artificial diet fro rarely escape, according to our experience, attacks of the which in many prove fatal. We have, on several occasions, s dren recover rapidly from such attacks, after suffering more or weeks, by the suspension of a diet consisting wholly or in t proportion of farinaceous materials, and the substitution of o posed of milk and cream, prepared with gelatin, and cont very small quantity of arrowroot, rice, or wheat flour (see a thrush, page 338). It is not merely the quality, but the quan of artificial food that proves injurious to infants. Overfeed always been recognized as a fruitful source of bowel comp early life. Another cause is the preparation of the food in t and rich a manner, thereby overtasking the stomach, intende the early months to receive only the thin milk supplied by The custom, therefore, of feeding infants on thick oatmeal gr but little or no milk, on what is called cracker victuals (crackers with water and sugar, or milk), on thick bread and preparations of rice of too solid a nature, or indeed, on any diet not consisting chiefly of milk, and in which feculent su enter merely as secondary constituents, may safely be assert the most frequent cause of the disease under consideration.

An unhealthy character of the milk of the nurse is also kno a cause both of simple diarrhœa and entero-colitis. When the cells which exist as a physiological element in the colostrum during the first few days after childbirth, continue to be pres that period, the infant is almost certain to suffer from enter and not unfrequently to die, unless weaned or transferred to nurse. So, also, when the milk departs widely from the nor acters which it should possess, as described at page 340; w nurse is liable to vivid moral emotions of any kind, or when to intemperance; the child is very apt to suffer either from th s enumerated, during the period of life specified, in each month of ry year, with the mean temperature of each month, and also the l mortality at all ages and from all causes in each year. The der must not forget what we have already stated, that there is ry reason to suppose that a large majority of the cases reported ler the head of cholera infantum are, in fact, cases of entero-colitis, t least what we have proposed to call entero-colitis, as opposed to less frequent choleraic disease to which we restrict the term cholera antum. It will be seen, in this table, that the two months of July l August furnish by far the largest proportion of deaths. In these months, when the mean temperature is noted between 70° and 80° hr., the deaths from this disease ran up to three and four hundred l upwards; whilst in June and September, when the temperature ges between 60° and 70°, the deaths average between 60 and 80, d rarely rise over 100; and in January and December, with a temrature of from 30° to 40°, they number from between 3 and 5 to 10 d 15. The effect of season is here so striking that it must interest , and can leave no doubt, we think, in the mind of the reader, but at the elevated temperature of summer is the main cause, in this city, the fatal intestinal disease we are considering. Whether heat alone ay act upon the system of the child to produce this result, or whether acts always by determining noxious gaseous products from the demposition of animal and vegetable substances thrown into our streets, s not yet been demonstrated. From the well-known fact, however, at those children suffer most who reside in the more filthy and owded part of the city, whilst the disease is very much less common the open country, and in the cleaner and better ventilated parts of e city, we may safely conclude that it is not heat alone that usually uses the disease, but that the emanations arising from garbage of arious kinds, and the imperfect ventilation of houses built in narrow nd crowded streets, have much to do in its causation.

We referred, in the general remarks at the beginning of this chaper, to the resemblance of the chronic diarrhœa of our armies during he late great war, in its mode of causation, symptoms, anatomical esions, and the effects of treatment, to the chronic form of entero-colitis n childhood.

Any one who will refer to the work of Dr. Woodward, already quoted, r to the essay on *Camp Diarrhœa and Dysentery*, by Dr. S. B. Hunt, in the *United States Sanitary Commission Contributions relating to the Causation and Prevention of Disease, and to Camp Diseases, &c.* (New York, 1867); or to the *Investigations upon the Diseases of the Federal Prisoners onfined in Camp Sumpter, Andersonville, &c.*, by Joseph Jones, M.D., published in the volume just alluded to; will find ample proof that improper diet, with heat, overcrowding, and want of cleanliness, will give rise to chronic diarrhœa, the essential lesions of which are to be found in radical blood-changes, perverted nutrition, and a localization on the alimentary canal in the form of entero-colitis, very much like the disorder we are describing. Dr. Woodward says, in fact, in speaking of the nature of this affection (chronic diarrhœa), at page 251: "F the account given above of the pathological anatomy of the dis there can be little doubt that this affection is to be regarded as con ing essentially of a chronic inflammatory process, involving prima the mucous membrane of the ileum and colon. It may, in fact, be scribed simply as a chronic ileo-colitis, with a tendency to ulcerati Dr. Hunt (*loc. cit.*, p. 294) says: "The essential fact in the pathol of all these various forms of flux is the same, and autopsies reveal distinction between cases of diarrhœa and dysentery. They are a an inflammation of the colon or of the small intestine, or of both, atten by ulceration of the mucous membrane. The solitary follicles of colon are seen to be enlarged simply, or ruptured, with punched- ulcerations following. The intestinal wall is thickened and chan in color to a red, brown, black, or greenish hue."

It may seem, at first view, visionary and wild to compare the chr entero-colitis or inflammatory diarrhœa of childhood to the same order in armies and camps; and yet we think there is a most strik analogy between the two as to causation, symptoms, anatomical lesi pathology, and the results of treatment. The main causes are same: improper diet; elevated temperatures, the high temperatur the summer season in children, and of the Southern States in armies; overcrowding, with foul air in camps and cities: the sympt are very much alike, a most obstinate diarrhœa, with great const tional suffering and emaciation; the same lesions are present, only advanced and extensive in most cases of children; and very much same results follow treatment: as in both diet is found to be more portant than drugs, and removal North in the armies, and in chil removal from crowded cities or low hot regions of the country to t elevated and cooler tracts, are found necessary. In children, a armies, if, at the beginning of the attack, the patient is removed f the causes which have produced a simple diarrhœa or a cholera in tum, the case is likely to go no further; but, if the same causes continued in operation, the simple diarrhœa passes gradually into chronic inflammatory form of entero-colitis, and at last the patien covers only when he is removed to a more favorable locality, wher diet is changed to a more healthy one, or, in the child, when he d through a long hot summer, and the cooler weather of October or vember, and a diminution of the exhalations caused by the sun heats in cities, bring at last, in the course of nature, the change w was essential to his recovery.

After the causes just enumerated, the one which appears to exer strongest influence is *dentition*. That the evolution of the teeth, th a physiological process, is a powerful predisposing cause of diarr and enteritis, cannot be doubted at the present time. It is one re nized by many of the most able writers and observers of the day, by most practitioners. MM. Rilliet and Barthez agree with Trous in the opinion that the simple diarrhœa so apt to occur in childr the epoch of the first dentition, is often the origin of chronic intes sions which finally reduce them to extreme debility and emaciation. They say that careful investigation will generally show that nearly all the cases of inflammation and softening date either from the epoch of dentition, from the period of weaning, or from the time at which some considerable change in the character of the regimen was made. M. Bouchut states that of 110 children in whom the first dentition was going on, 26 escaped any indisposition, 38 suffered from restlessness, colics, and occasional diarrhœa, so mild as to excite no alarm in the parents, whilst 46 had abundant diarrhœa. In 19 of the last series it appeared coincidently with the fluxion of the gums, occurring at the time of emergence of each tooth, and disappearing entirely in the intervals; in the remaining 27, in all of which the process of dentition was difficult, the diarrhœa persisted and gradually assumed the characters of entero-colitis. M. Legendre and M. Barrier (*loc. cit.*) both agree in ascribing very great effect to the influence of dentition in the production of diarrhœa and entero-colitis. The former asserts the diseases referred to to be much the most frequent between the ages of six or seven months and two or two and a half years, which includes exactly the period occupied in the first dentition, while they are only met with exceptionally after three years of age.

The act of *weaning* is very apt to result in the production either of simple diarrhœa or entero-colitis, in consequence, no doubt, of the irritation set up in the gastro-intestinal surface, by the change of food made at the time. The diarrhœa which occurs at this period was formerly, and is still, not unfrequently, called *weaning-brash*. Dr. Stokes (*Cyclop. of Med.*, Art. Enteritis) says of this disease that it "is manifestly an acute enteritis, produced by the change of food, and in which nature seeks to relieve the inflammation by a supersecretion."

Entero-colitis is prone to occur as a secondary affection in many of the acute diseases of children. It is by far the most common in the course of the eruptive fevers, particularly measles, and in that of typhoid fever. It is also a frequent complication of the latter stages of pneumonia.

That children of feeble constitution and lymphatic temperament are more disposed to the disease than others, is sufficiently proved by the evidence of various observers. Lastly, that the incautious and excessive use of perturbing systems of medication, addressed to the digestive tube, often occasions diarrhœa and entero-colitis, is fully proved by the researches of MM. Rilliet and Barthez, and by our own experience.

MORBID ANATOMY.—SEAT OF DISEASE.—It has been already stated, that the alterations of the large intestine are, as a rule, much more frequent and serious than those of the small intestine. It appears from the researches of MM. Rilliet and Barthez, and Legendre, that enteritis rarely exists alone; whilst colitis by itself, or combined with enteritis, is quite frequent. M. Legendre states that inflammation of the small intestines never occurs without corresponding lesions of the large bowel, while in 28 cases of diarrhœa, he found the large intestine alone diseased in 9. From a table of different intestinal lesions, given by

Rilliet and Barthez (*op. cit.*, t. i, p. 692), it appears that they have with 45 cases of erythematous, pseudo-membranous, ulcerative or tular enteritis; with 113 of the same forms of colitis; with 90 of licular enteritis; 64 of follicular colitis; and with 28 of softening of small, and 35 of softening of the large intestine. Dr. J. Lewis Sm (*op. cit.*, p. 367), offers an analysis of the post-mortem appearance 82 cases of intestinal inflammation in children. The upper part of small intestine, embracing the duodenum and jejunum, was found flamed in 12 cases, while in 51 cases it was free from inflammation of a pale color. The ileum was inflamed in 49 cases, and the cæcal tion, including the ileo-cæcal valve, was the part in which the infl mation was uniformly most intense, and to which it was often confin in 13 cases there was no enteritis whatever, and in 16 there was no flammation of the ileum, so that the ileum was inflamed in all bu cases where enteritis was present. On the other hand, in all the ca excepting one, namely, in 81 out of 82 cases, there were lesions in cating inflammation of the mucous membrane of the colon. In 39 inflammation had affected nearly or quite the entire extent of this tion of the intestine; in 14 it was confined to the descending port entirely, or almost entirely; in 28 cases, the records state that col was present, but its exact location is not mentioned.

We may add, that, in the quite numerous autopsies we have m after death from this disease, we have invariably found the large in tine involved, the inflammatory lesions being in some cases limited it, while in others they also extended into the small intestine.

It is, therefore, clearly established, that in the inflammatory diarr of children, inflammation of the large is considerably more frequ than that of the small intestine, and much more apt to exist al The lower end of the ileum is the portion of the small intestine wh presents the most advanced and severe lesions; while in the large testine the lesions are most marked in the caput coli, sigmoid flex and descending colon.

In our description of the lesions of entero-colitis, we shall divide th into those found in the acute and chronic forms of the disease res tively; a division made for the sake of correspondence with the desc tion of the symptoms, although the lesions found in the two stages d from each other only in extent and degree.

Thus, in the acute stage, the lesions consist of increased vascula thickening and softening of the mucous membrane of the intestine, enlargement of the intestinal follicles; while in the chronic form t is discoloration, thickening, with infiltration and induration of the of the intestine, and more or less extensive destruction of the mu membrane from follicular ulceration.

In the acute stage, the increased vascularity (inflammatory hy æmia) may present itself as a uniform, more or less intense redness o mucous membrane; an appearance which may sometimes exist in duodenum, but far more frequently is observed in the lower end of ileum and in the colon. More frequently it takes the form of arb congestion, occurring in patches surrounding the enlarged follicles. peritoneal surface may also be more or less vascular, and quite fre-tly there are little patches of redness and arborescent vascularity, esponding to the bases of the inflamed mucous follicles.

he thickening of the mucous membrane usually corresponds to the ree of vascularity, and when the latter is but slight, may be scarcely reciable; while in other cases, and especially when associated with h enlargement of the mucous follicles and œdema of the submucous ne, the thickening is highly marked. The inflamed portions of the cous membrane are also more or less softened, so that they can be ached from the subjacent coats more readily than in health. In e instances the softening is so extreme that it is impossible to raise the mucous membrane in strips at all. These lesions are all most quent and marked in the lower part of the ileum, and in the descend- part of the colon. In addition to these changes in the color, thick-s, and consistence of the mucous membrane, the mucous follicles are minently enlarged. In the normal state, the isolated follicles of the cous membrane of the intestine, in young children, appear as minute yish-white bodies, and present a grayish point, the excretory orifice, ich is only visible with the aid of a lens. In the course of entero-itis, however, the morbid development which they undergo causes em to present the following characters. The isolated glands are en-ged, and seem, therefore, more numerous than in the healthy condi-n; they appear in the form of lenticular grains seated in the texture the mucous membrane, sometimes projecting from its surface, some-es not, and in other instances appearing to be situated beneath it; e excretory orifices of the follicles are often enlarged and tumid, and sily distinguished under the form of a grayish or blackish point in e middle of the gland; in other cases the orifices cannot be distin-ished until slight pressure is made upon the crypts, when a drop of rbid mucus may be seen exuding through the open point. The color the distended follicles is dull white, rosy, or yellowish; they are enerally from one-third to two-thirds of a line in diameter. Dr. orner (*Amer. Jour. Med. Sci.*, Feb. 1829) speaks of them, in this state f development, as resembling "small grains of white sand sprinkled ver the mucous membrane, and about the size of a millet-seed."

The agminated glands or patches of Peyer are found in the same tate of increased development; they are tumefied, and project above the level of the surrounding mucous membrane, and the orifices of the follicles are congested, so as to appear as dark points, giving to the patch a dotted, punctated appearance, which has been compared to the freshly-shaven chin.

A little later the enlarged follicles present minute, oval, or round ellowish spots upon their summits, which soften down and allow the ontents of the follicles to be discharged. The enlarged orifice of the ollicle will then admit a small probe, and may even measure one-half line in diameter. It leads into a little cavity, which is the follicular ac. The mucous membrane which overhangs this cavity like a fringe, is thus undermined and partly cut off from its vascular supply, so that we may find a process of ulceration advancing in it until the base of the distended follicle is exposed, appearing as a small, oval, or round shallow ulcer.

These various conditions of the follicles may all be seen at the same time in a single portion of intestine. The enlarged patches of Peyer often have the appearance of being ulcerated, but a careful examination will generally show that this is not the case. The appearance depends upon the enlargement of the orifices of the glands, upon unequal tumefaction of the surrounding mucous membrane, and upon the presence, in the patch, of small, irregular grayish points, consisting of pultaceous matter, which makes the patch look more uneven and projecting than usual. If, however, the pultaceous layer be gently rubbed with a piece of linen, it can easily be detached, when the mucous membrane beneath is found red, softened, and thickened, but not ulcerated. In comparatively rare cases, however, there are superficial erosions of the mucous membrane, covering the prominent patch.

The exact date at which the ulceration of the follicles begins, is as yet undetermined, and probably varies greatly in different cases. It frequently happens, however, that death occurs, especially from the supervention of a choleraic condition, whilst they are still merely in a state of enlargement. When, on the other hand, the disease passes into the chronic form, the lesions which we have above described become more and more extensive. This is especially the case with the lesions of the large intestine, for it is even more true with regard to chronic than acute entero-colitis, that the chief seat of the disease is in the colon.

In chronic entero-colitis, the intestine is often contracted, and the peritoneal surface may present patches of discoloration. The thickening and infiltration have now affected the submucous and muscular coats, and have been followed by induration of the tissues, so that the walls of the intestine are often abnormally rigid. This is especially true with regard to the lower part of the descending colon and the rectum. The mucous membrane is seen to be riddled, not with mere superficial erosions, but with true ulcers, affecting the whole thickness of the membrane. These ulcers, when isolated, are from one to one and a half lines in diameter, oval or circular in shape, and either have sharp-cut edges, as though the piece of mucous membrane had been cut out with a punch, or the mucous membrane bounding them is undermined. Frequently, however, these ulcers coalesce, and at the same time extend in depth, so that large, sinuous, irregular ulcers are formed, with thickened, slate-gray, undermined edges, and having for their base either the submucous or muscular coats, which may be covered with a pultaceous, apparently pseudo-membranous layer, of a grayish-white color. These ulcers surround and include irregular islets of mucous membrane, which are swollen, infiltrated, vascular, and discolored. That the large and deep ulcerations just described, even when most extensive, take their start from the mucous follicles, is proved by

by Woodward (*op. cit.*); and one of the most powerful argu-
avor of the essential identity of the two affections, is the per-
spondence between their anatomical lesions. We present be-
mary of the microscopical changes in the intestine during the
ent of these lesions, as determined by the careful investigations
odward (*op. cit.*, p. 246). In the early stage, attended merely
kening and softening of the mucous membrane, microscopic
ion shows marked multiplication of the connective-tissue cells
base of the follicles, and soon the tissue is occupied by great
f small, rounded, or slightly polygonal cells. The delicate
nuscular tissue immediately beneath the base of the follicles,
at first, enlargement and proliferation of its nuclei, whilst
ften ceases to be recognizable, being obscured by the luxuri-
rowth. In the most intense cases, the cell-growth here de-
attained toward the surface of the membrane, may take place
ut its whole thickness, and even involve the subjacent muscu-

lar proliferation takes place in the connective tissue, which lies
the follicles. The epithelial layer, which invests the mucous
e, and is prolonged into the tubular follicles, either is the
pid cell multiplication, or is exfoliated and replaced by round
cells from the adjacent connective-tissue cells. The epi-
ning, near the orifice of the follicles, appears to undergo these
most readily and with the greatest rapidity.

osed follicles also present rapid cell multiplication, which af-
parenchyma of the follicle, as well as the connective tissue of
le and the surrounding cellular tissue. Microscopic examina-
n shows the follicle distended with small, rounded, granular
l imbedded in a luxuriant growth of similar cells, which ren-
most or quite impossible to draw the line where the follicle
es and the surrounding connective tissue begins. "Ulceration

ing the process until undermined, and its nutritive supply c Hence arises the excavated undermining character of the edges ulcers. From the anatomical point of view, it will therefore b ceived that the morbid process, in the cases in which there is no ation, is essentially the same as in those in which ulceration is pr The one lesion is only a later stage of the other."

Not unfrequently there will be found one or more intussuscepti the ileum. These are usually readily restored, and have evident curred during the act of dying. Smith has, however, "in a fe stances, found intussusceptions, which sustained the weight of tw or more of intestine, without being reduced, and which, from bei their interior more vascular than the contiguous membrane, had ably occurred some hours or days before death, but being suffici pervious to allow the food to pass, the symptoms of obstruction lacking."

The *Mesenteric and Mesocolic Glands* are nearly always enlarge most marked enlargement corresponding to the lower end of the i and the descending colon. The enlarged glands are of a pink and rather more soft and succulent than normal.

Stomach.—In the great majority of cases the stomach is quite hea in a few instances, however, there may be found congestion of th cous membrane, slight enlargement of the mucous follicles, or soft of the mucous membrane, probably cadaveric in most cases.

Liver.—Many authorities, apparently led by the presence of s toms supposed to indicate disturbance of the function of the liver, assumed that there is in most cases of entero-colitis some m condition of this organ, but extended observation has disprove view.

Thus Hallowell (*Amer. Journ. Med. Sci.*, July, 1847) found, that cases, the liver was affected in but 1 case, when it was enlarged Smith (*op. cit.*, p. 370) has published the result of 32 post-morte aminations in regard to this point, which confirm the same conclu Thus, he states, "there was no evidence from the post-mortem ap ances of the liver in these cases of any congestion, or torpidity, o peractivity, or perverted secretion. The size of the liver was in cases very different in those of about the same age, but probably was no greater difference than usually obtains among glandula gans within the limits of health. In most of the cases the live examined microscopically, and the only fact worthy of note obs was the variable amount of fatty matter. Sometimes it was in ex sometimes in moderate quantity or rather deficient, and sometim greater amount in one portion of the organ than in another."

The thoracic viscera present no constant or important lesion, th in a certain proportion of cases, there may be found more or less static bronchitis with collapse of portions of the lungs.

When death occurs during the acute stage, the brain presen lesions dependent upon the disease. When the case has been protr and attended with much wasting of the solids and fluids of the

, the period of dentition, high temperatures, improper food,
in cities, and especially the crowded occupation of small and
ted buildings, in narrow courts and alleys, where unhealthy
ns arise from the decomposition of filth and dirt of all kinds,
hief conditions which precede the outbreak of the disease.
these conditions act to produce their effect is still a matter of
'o attempt to reason upon a matter so full of difficulty seems
seless, and yet we shall venture to place before the reader
ughts we have had upon the subject.

are two broad generalizations which we think may be safely
to be true. 1. An unhealthy food, one incompetent to furnish
dy what it needs for the purposes of nutrition, as farinaceous
nhealthy milk, is sure to produce the disorder we are consider-
atter how favorable may be the circumstances, in all other re-
which the child is placed. 2. The best breast-milk in the
the most correct artificial diet, will not save a child from this
who is located in an ill-ventilated house in a dirty and filthy
f a large city during hot weather. Here the heat to which
is exposed, the heavy air loaded with foul exhalations which
s, determines a condition of the health in which the digestive
n no longer digest properly the food offered them. In both
same result is produced. In the first, the stomach cannot
e originally improper character of the food into healthy ma-
n the second, the diseased and enfeebled organ loses the power
even proper food. In both the alimentary canal is filled with
cts of an improperly digested food. Whether these unhealthy
in the alimentary canal act chiefly as local irritants to the
membrane, and thus determine the tissue-changes met with;
er, as Rilliet and Barthez suppose, some morbid condition of
is brought about, which of itself gives rise to the changes in
us membrane through a morbid action of the diseased blood

days or weeks, the general debility of a slow inanition, and blood-alterations which resemble those of scurvy.

Symptoms; Duration.—In infants the *acute* form of entero-colitis generally begins with restlessness and fretfulness. The mother observes that the child sleeps less than usual and for shorter periods, and that its sleep is uneasy and broken by sighing or moaning, or by occasional expressions of pain flitting across the face. It takes the breast less frequently, and is satisfied to nurse for a shorter time, showing thereby an evident diminution of appetite. At the same time it is apt to reject its milk in larger quantities than usual, and this is often observed to have a very acid smell. After these symptoms have lasted a few days, and sometimes without them, the peculiar symptoms of the disease, the diarrhœa and other abdominal symptoms, make their appearance, and are accompanied by febrile reaction in most cases.

In older children the acute form may come on suddenly, with diarrhœa, loss of appetite, thirst, sometimes vomiting, abdominal pain and fever from the first; or, as happens very frequently, the case begins with slight diarrhœa, unaccompanied by fever or other signs of sickness, and it is not until after several, or eight, ten, or even more days, that signs of inflammation make their appearance.

After the disease is established, the most important symptoms are the following. The *diarrhœa*, which is the most prominent and characteristic, presents various characters. In order to appreciate this symptom as its importance requires, the practitioner ought always to see the napkins of the child at least once, and often more frequently, in the day. It exists in almost all cases of entero-colitis, in the erythematous and follicular inflammations, and in the ulcerations and softening which accompany or succeed simple inflammation. It is seldom absent, and yet that it is so sometimes, is proved by the facts mentioned by MM. Rilliet and Barthez, who state that they have calculated, from their cases, that it is wanting in about one of every twelve cases of inflammation or softening of the intestine. They add, however, that it is absent only in slight attacks, and is always present when the disease is severe. It varies greatly as to the frequency, abundance, and character of the stools. It varies also in its mode of progress, so that it presents great differences as to all these points from day to day, and at different portions of the same day. We may remark, in general, however, that in proportion to the severity of the inflammation, so is the diarrhœa violent and constant, and that it usually increases as the signs of inflammation become more and more marked. It is rare to have severe diarrhœa when the anatomical lesion is of slight extent, though this does sometimes happen. The *number* of the stools, as has been stated, is exceedingly variable. This depends in great measure upon the violence of the case; for, while in those which present the symptoms of an inflammation of small extent the stools seldom amount to more than six or eight a day, in those in which the evidences of more extensive and severer inflammation are present, there will be fifteen, twenty,

nty-five, or even more per diem. The *consistence* of the stools may y between that which characterizes them in a state of health, and t of the thinnest serous fluid. The *materials* of which they are comed consist chiefly of mucus, bile, serum, small portions of feculent tter, portions of undigested casein or other food, and blood. M. uchut (*loc. cit.*, p. 219) describes those of very young children as preting the following characters:

1. They are semifluid, homogeneous, greenish, and similar to cooked getables; neutral.
2. Semifluid, homogeneous and green; often acid.
3. Semifluid, heterogeneous, greenish, and mixed with yellowish gments of ordinary fæces; neutral.
4. Semifluid, heterogeneous, greenish, and mixed with fragments of digested casein; acid.
5. Diffluent, greenish, heterogeneous, composed of a large quantity water in which float yellowish and greenish or whitish particles; id.
6. Diffluent, greenish, like the preceding, and mixed with gas of a wkish and sometimes sourish smell.
7. Diffluent, completely serous.
8. Bloody stools are very rare at this age.

Such are the appearances of the stools in children who have not mpleted the first dentition. After the epoch of the first dentition the sease becomes much more rare, and when it occurs, is generally of a ilder character, so that the discharges differ less from their healthy haracters. Under these circumstances, they are usually less frequent, ot often exceeding six, eight, or ten in the day, and retaining genery their yellow color or becoming brownish; they are commonly of semifluid consistence, and may be called bilious. When, on the conary, more frequent, they become fluid, abundant, mixed with mucus, nd are either of a light yellow or brownish, or more rarely, of a reenish color. In some cases there are, in addition to the substances entioned, pus, which indicates ulceration of the lower portion of the testine, and fragments of false membrane. Moreover, it is very comon in older children to observe traces of blood in the stools, somemes in considerable quantities. We may remark that we have several mes met with stools containing blood in children within the year, ut much less frequently than after that age. The presence of blood enerally coincides with small and frequent stools, attended with much raining, and often severe pain, and almost always indicates follicular flammation and ulceration of the large intestine.

The serous fluid alluded to sometimes constitutes the whole of the scharge, so that the napkins are merely wetted through, without ny or but a very small quantity of solid matter being left upon them. his kind of stool is very frequent in the cholera infantum of this untry. The *odor* of the stools is important. In the beginning, while e discharges still retain some of their natural characters as to color d consistence, it is often very offensive, but as the case goes on, and the greenish color predominates, it is either sour, or becomes very slight. In some violent cases, in which the discharge consists of a watery, dark-brown fluid, the odor is fetid.

After diarrhœa, the most important symptoms are those which concern the *form*, *size*, and *tension* of the *abdomen*, and the presence or absence of *pain* or *tenderness* on pressure. In infants the abdomen is more distended than usual; but, according to Bouchut, the tension depends on the muscular effort made by the child to resist the hand of the physician. He says that when it is carefully examined, while the attention of the child is attracted in some other direction, it is found to be soft and supple, and rarely painful to the touch. In older children it is, in many acute cases, but not in all, enlarged, sometimes tense and sonorous, and very generally painful to the touch. The seat of pain is variable, but generally it is in one of the iliac fossæ or at the umbilicus. It is seldom acute, though the child not unfrequently shrinks away and cries out, as though it were excessive, from fear of the examination. It is easy to distinguish when the pain is real and when apparent, by withdrawing the attention of the child, by some device, from the examination, in which case it will cease to notice the palpation; or by touching some other part of the body, when, if the crying and shrinking depend on fear or nervous excitation, they will be as violent as when the abdomen is touched. Pain to the touch is an important symptom, as it is very generally indicative of acute enteritis. *Gurgling* is rare, according to MM. Rilliet and Barthez, in ordinary entero-colitis, though very generally present in typhoid fever.

Vomiting is very common in young infants, and is generally repeated several times a day. In severe and rapid cases it is a very troublesome and alarming symptom. In older children it is much less common, and is never really violent, except in some of the most acute cases. In them it is confined to the first few days of the attack.

After the diarrhœa is fairly established, young infants are almost always either very irritable, peevish, and restless, or weak, languid, and subdued. Their slumber is short and disturbed, and generally they sleep much less in the twenty-four hours than when in health, unless under the influence of anodynes. Older children are generally somewhat restless and irritable, but much less so than infants. There is seldom any disorder of the intelligence, though in acute cases there is sometimes slight delirium or headache. *Fever* exists in all acute cases. It is seldom continuous in infants except for the first few days, after which it almost always assumes the remittent type. It is marked by increased frequency of the pulse, which rises to 120 and 140, or in bad cases much higher; by heat of skin, often intense during the exacerbations; by thirst and diminished appetite; and by dryness and heat of the mouth. In older children the pulse is not generally so high as in infants, and in many of the mild cases the fever is very slight or there is none at all. In acute cases, however, it is sometimes continuous, and marked by rapid pulse and great heat of skin.

The *tongue* is generally normal, though sometimes red on the edges rance of vigor and strength, to that of the greatest debility. As curs the flesh loses its firmness, the skin hangs in folds upon the and limbs, and is dull and dirty in its tint, the eyes become and surrounded with bluish circles, and the whole appearance child is that of misery and exhaustion.

fants, it is very common to meet with erythema of the buttocks ighs, produced by the contact of the acrid stools and urine with parts. This symptom is said by Bouchut to exist in five-sixths cases. We feel quite sure that it does not exist in so large a tion of those which occur in private practice, though we have ith it in numerous instances. When severe it is generally accom- by papules, which ulcerate after a time and form superficial ions upon the skin. These ulcerations sometimes run together, come of considerable size and depth. In the form of the disease th in the children's hospitals in Paris, erythema and ulcerations heels and internal malleoli are also met with, and constitute a complication in the case. They are said to depend on want of ness, and the rubbing together of the feet of the child, unpro- by covering. We have never met with them in private practice.

duration of the disease is stated by the French writers to be lly about fifteen days, at the end of which time convalescence is established. It may be shorter or longer. According to our xperience it is entirely uncertain. Most of the cases that have nder our notice have been rather shorter. The disease subsides lly. The number of stools diminishes; they become less abun- nd more consistent, and return to their natural color and odor; in on pressure, and the enlargement and tension of the abdomen ear; and as this occurs, the fever subsides, the appetite returns, nper improves, and the child enters into full convalescence.

chronic form of entero-colitis generally follows the acute, though etimes presents many characteristic features from the first. It

The tongue is generally moist and natural, though in some ca and dry, whilst in others it, together with the lips, partakes pallor which pervades all parts of the body. The abdomen is distended and sonorous on percussion, and may be painful or pressure in different cases, or in the same case at different per the disease; its parietes sometimes offer no resistance to the to that the intestinal convolutions may be readily felt by the h even between the fingers; and in some cases we have seen them and relaxed, though the abdomen was more prominent than n that the outlines of the intestines, and even their peristaltic mov were visible upon the exterior. The appetite generally pers spite of the gravity of the disease, and is sometimes increased. stools, as has been stated, are not so frequent as in the acut seldom numbering over six or ten in the day and night. They of the products of an imperfect digestion, and contain not unfreq the alimentary substances in the state in which they were swal mixed with mucus, serum, pus, and sometimes blood. Their consi varies constantly, but they are usually semifluid. Their odor is natural, and often extremely offensive.

The *course* of the disease is very irregular. Even in the wor most prolonged cases intermissions or remissions occur, so th child will often improve greatly for days or weeks, and then su relapse into as bad a condition as ever. In favorable cases th missions become more and more frequent, and the symptoms gra improve, until at length the child is restored to health. In fata death is occasioned by the utter deterioration of the general which finally occurs, and the child perishes, worn out by long or, as more frequently happens, some complication arises which on the fatal event. Thrush is a frequent complication of chro tero-colitis, and doubtless often hastens the death by the impe which it occasions to the nursing or feeding of the child. Vo has almost always occurred towards the close of the fatal cas we have seen, especially in those in which extensive thrush was p

The *duration* of this form is of course very uncertain. It m for weeks or months. We have known it to last two and three in several cases, and in two others it lasted with occasional in sions, in one a year, and in the other eighteen months.

Diagnosis.—The diagnosis of acute entero-colitis is not d There is no disease with which it is likely to be confounded. characteristic features of the malady are the diarrhœa and ot dominal symptoms, and the absence of signs of other disease. secondary cases are distinguished by the occurrence of the usual toms of entero-colitis during the progress of the primary malad

The chronic form is not likely to be mistaken for any other di unless it be the diarrhœa which occurs in tubercular disease, from it is to be distinguished by the presence in the latter of the s tuberculosis of other organs.

Prognosis.—Acute entero-colitis is always a serious disease

more fortunate and more healthful hygienic conditions. It is
ngerous disease in summer than in winter. In hospitals for
t is a very fatal disorder, owing to the bad hygienic conditions
ich the inmates are placed. In children who have passed
he first dentition, the prognosis is, as a rule, favorable. The
seldom dangerous in such cases when it occurs as a primary
while, as a secondary affection, on the contrary, it is much
to be serious.

favorable symptoms are: great frequency of the stools; col-
lent vomiting or retching; and dangerous cerebral symptoms,
rigidity of the limbs, paralysis, or convulsions.

MENT.—The *prophylactic treatment* is very important. It in-
tention to *habitation*, *diet*, *dress*, and *exercise*. The most fre-
uses of entero-colitis are high summer temperatures, residence
healthy locality, and improper diet. A child may have been
he most healthy parents; may be living, if an infant, on the
lthy food in the world, the milk of a perfectly sound woman,
have been weaned, on the best possible substitute for breast-
e selected by the most consummate medical art; and yet, if it
fortunate resident of some low, crowded, and unclean part of
ur cities in the summer season, it has but small chance of es-
flammatory diarrhœa or cholera infantum, to be followed by
diarrhœa. Or, a child may be living in the best part of these
ith every advantage that wealth and the medical art can give,
n the period of the first dentition, and the summer heats be
will be only too apt to have some form of the disease we are
ing. Under the latter circumstances, its chance of escaping
se will be vastly greater than under the first-named conditions,
true prophylaxis is, where the parents are so situated as to be
lo that which is best for the child, removal from the city during
season (from the early part of June to the last week of Septem-

seaside, than from a change to the interior; but, nevertheless, continued residence of three months, we prefer a high interior loc

On the other hand, if a child be placed in the most favorable pos condition as to locality, and the diet be a radically bad one, a defi or unhealthy breast, improper artificial diet, or a foolish allowan the part of the mother or nurse to the child of a variety of vegeta of fruits, and especially of berries like currants or gooseberries (an have known such things), it can scarcely escape the penalty of a illness more or less severe.

A child who is so unfortunate as to get a sharp attack of entero-c in June or July, is very apt to continue more or less sick during rest of the summer, so that the true prophylaxis is to take it away the city early in June to avoid this danger, and not to return until the September heats are over.

As the reasons for decisive medical action in any disorder canno too strongly demonstrated, and as this subject of removal is a very portant one, we think it well to advert here to the results of experi in this matter in the diarrhœa and dysentery of our armies during late war. Here we have the experience of intelligent army me officers in vast numbers of cases,—cases, too, so grouped together give opportunity for the most accurate observation. In the *San Memoirs of the War of the Rebellion, collected and published by the U States Sanitary Commission* (Chapter VII, *Camp Diarrhœa and Dyse* by Sanford B. Hunt, M.D., p. 291), will be found a most valuable essa the causes and treatment of diarrhœa and dysentery, which no one read without being impressed with the similarity (saving the ages o patients) of those diseases to the one we are describing. At page 304 Hunt says: "But in others the disease progressed, became follicular finally ulcerative. In the treatment of these, great difficulty was perienced, from the fact that the patient was still exposed to the ca of this malady; and it came to be a fixed doctrine at Southern Southwestern stations that confirmed cases had no security for except by removal to the North. This soon became a governm policy, and hospitals were established in New England, along the La and in the Northwest, to which chronic cases were sent in great bers. Among patients not thus removed, but treated in Southern pitals, much vacillation and irresolution were exhibited in the pres tions of surgeons, as happens in all diseases, the treatment of whic drugs is usually unsuccessful. To trace the history of an indivi case was to find that the prescriber had run the round of all reme from opium to astringents, from astringents to quinine, from quini bismuth, and from bismuth to nux vomica, from nux vomica to m rials, returning almost always to opium as the drug, which at least viated, if it did not cure."

The *dress* ought to be suited to the weather. It is best to kee the child, even in hot weather, a very thin and soft flannel shirt, short sleeves. This should never be removed. A young infant sh wear all summer long a thin and light flannel petticoat. A child a old may have the flannel petticoat removed for a few days when the temperature rises to above 85° or 90°, when it suffers evidently from the heat; but so soon as the temperature falls to 85° or below, the petticoat should be replaced. This happens only for a few days in our summer season, and the change should be made with great care, and only under the supervision of an intelligent and watchful mother or nurse.

Exposure to the open air is another point in the prophylactic treatment which is of great importance. In country houses in the summer, a young infant may get nearly as much air as it needs, but in cities the air of houses is much more dull and stagnant, and the child ought to be carried out into the streets and squares for several hours morning and evening. If possible, it should be taken to drive into the open country. Short excursions, by rail or boat, for the children of the poor, who cannot escape from the city in summer, are very useful in carrying the child safely through the summer. But in all such jaunts after health, the parents should so arrange matters that the child shall be as little fatigued as possible. The best plan is to go in the morning and return in the evening, resting through the middle of the day at some point where the child can take rest and midday sleep, which are quite as important as fresh air. Included in this subject is that of *exercise*. This becomes very important when the child is old enough to walk and run, for then an ignorant or thoughtless woman might think the more exercise the better, whereas it is necessary to watch such children very carefully, since, if they are allowed or enticed to take undue exercise, the resulting fatigue becomes a positive cause of diarrhœa. A child of two or three years old should never be induced to take long and continuous walks; it ought to frisk and play, not walk straight ahead, like a man in training; for that kind of exercise, we have remarked, never suits children well.

It has already been stated that one of the most frequent causes of the malady is the attempt to bring up the child on artificial diet, and particularly on one of an improper kind. It is clear, therefore, that to avoid the disease it is necessary that the child should, if possible, be nursed. If this cannot be done, the diet ought to be wisely selected and regulated in all its details by the physician. The one most proper is evidently that which most closely resembles the natural aliment of the infant. For directions as to diet, we must refer the reader to the remarks upon diet at page 331, where we have discussed this point quite fully.

Diet in the Attack.—After the disease has made its appearance, the diet should be very carefully regulated. This constitutes, in truth, the most important point in the treatment. If the child is nursing, it ought to be confined entirely to the breast, and should the nurse have a large quantity of milk, and the stools exhibit considerable quantities of undigested casein, it must be somewhat restricted as to the frequency and length of time it is allowed to nurse; in other words, it must be moderately dieted for two or three days. Should there be the least

circumstances, to add four and even more parts of water to tl
instead of two or equal parts, as is the usual custom.

In older children the diet, for a few days, ought to consist o
milk and water, or of thin preparations of arrowroot, rice flo
tapioca, or wheat flour, made with milk, or milk and water, wi
quantities of bread, or, if the child refuse such articles, panada,
chicken- or mutton-water may be allowed. The quantity of foo
ever it be, must be determined very much by the child's i
When the appetite continues, we can seldom go wrong in allo
much of these simple foods as the patient will take. Still, th
cian ought to know accurately the amounts that are given, a
finds the patient taking a full healthy average, or more, it wil
to restrict the quantity somewhat, and offer water frequently
supposition that the little patient is taking its liquid food m
thirst than hunger; or else increase the water of the foo
have reason to believe that the solid matter is in too large a
tion.

Therapeutical Treatment.—We have found a large numbe
mild cases that have come under our notice to recover und
simple treatment. When the patient is an infant at the breas
the period of dentition, the simple direction not to allow it to
much as usual; the use of a warm bath morning and evenin
skin be heated and the child restless and fretful; the administra
small dose of castor oil (half a teaspoonful to a teaspoonful), or
syrup of rhubarb in the same quantity, with half a drop to a
laudanum, at the beginning of the attack, to remove any undige
that may be lying in the bowels, followed in one or two days, i
order continues, by some simple astringent remedy, generally
to effect a cure. When, on the contrary, the case depends o
healthy or insufficient milk, when the child subsists entirely

ith mucus, muco-pus, or blood, and the abdomen tense and painful to e touch, moderate local depletion by leeches may be used with advan-ge and safety in vigorous children. The leeches are best applied er the lower part of the abdomen. About six or eight American eches, or two foreign ones, may be applied at the age of one or two ears, so as to take about two ounces of blood. Of late years, however, e have not employed depletion so much as formerly, but use instead arm baths, poultices to the abdomen, or warm stupes, and refrigerant edicines. Small doses of the sulphate of magnesia and laudanum are ery useful; or we may employ spirit of nitrous ether, or solution of the cetate of ammonia with paregoric or laudanum, or the following mix-ure:

℞.—Sodæ Bicarb.,	ʒss.
Mass. Hydrarg.,	gr. iij.
Tr. Opii Camph.,	gtt. L vel f℥j.
Syrup. Simp.,	f℥ij.
Aq. Menth.,	f℥xiv.—M.

Dose, a teaspoonful every three or four hours.

The warm bath, used at a temperature of 95° to 97°, twice or thrice day, is most excellent. It is a good plan to wrap the child, immedi-tely on being taken out of the bath, in a warm muslin sheet, and over his a light blanket, and let it lie on the lap or bed for twenty minutes r half an hour. The hot poultice or stupe recommended above, should e covered with oiled silk, secured by a towel pinned around the body, hanged every three or four hours, and kept on for the greater part of he day, or for several days.

Calomel has been so highly recommended and so long employed in hese cases, that we feel some hesitation in saying how often it has dis-ppointed us. Certainly we have found in many children that it was of no evident use, and in the old-fashioned doses of a grain or half a grain, we think it only adds to the irritation of the bowels. In doses of the twelfth and eighth of a grain, with chalk and opium, every two or three hours, we formerly thought it was sometimes useful, but we cannot resist the impression which years have given us, that the useful agents in these instances have been the chalk and opium, and especially the opium. The blue-pill mixture, recommended above, we still put trust in. Why blue pill should answer where calomel irritates, we do not pretend to explain, but such is the opinion to which experience has led us.

Before quitting this question of the use of mercurials in diarrhœa, we wish to quote the results at which some of the more modern ob-servers have arrived, with the remark, as we pass on, that our own conclusions were much the same ten years ago as those expressed above. We shall do this even at the risk of being tedious, for we think the point a very important one. In the first place, we shall quote the opinion of one of the ablest of the United States army sur-geons, as to the use of this drug during the late war. The writer (*Outlines of the Camp Diseases of the United States Armies as observed dur-*

ing the Present War, by J. J. Woodward, M.D., Philadelphia. 18
the article on Chronic Diarrhœa, a disorder closely akin in man
symptoms and anatomical lesions to the entero-colitis of childre
at page 262: "Among the remedies liberally employed in chroni
rhœa is one group which can only be mentioned with disappro
This is the mercurials, which are too frequently administered to
salivation in the form of blue pill or calomel, combined with opiu
ipecacuanha. The authority of some of the most distinguished
can medical writers is in favor of the employment of mercurials
chronic diarrhœa of civil life; yet when it is remembered tha
those modern writers, who most warmly advocate their gener
ployment in the treatment of inflammation, recommend them to
continued as injurious whenever the process has gone on to ulce
it would appear that even sound mercurialists would avoid usin
in the form of chronic diarrhœa which is most common in the a

"Practically it will be found that although in some cases mer
may succeed, as much less dangerous remedies would have d
checking the progress of the disease, yet that in the majority o
their employment is accompanied by an increase of the debili
loss of appetite, the anæmia, and the general constitutional sym
without any diminution in the frequency of the stools. Th
therefore, to be regarded as dangerous and inefficient, and their
these cases has been completely abandoned by those surgeons w
most successful in the treatment of the disease."

Dr. T. K. Chambers, of London (*Clinical Medicine*, London, 1
517), in considering the treatment of diarrhœa in which the sto
hibit the products of acute inflammation, says: "The drugs
most trust in are calomel, ipecacuanha, and carbonate of soda.
first and second equal quantities, and a double quantity of the
may be made into powders, of which from four to six grains, acc
to the child's age, may be given every three hours. This is a
tionary powder, but it is right to say that I have in a good m
stances lately left out the calomel, and the case has done just a
if not better, without it."

Dr. J. L. Smith, of New York (*op. cit.*, p. 379), says nothing
ever about mercurials in his article on the treatment of inflam
diarrhœa, from which we are led to suppose that he does not use
He however quotes Dr. E. H. Parker as giving, when the conditi
proaches that of dysentery, a mixture consisting of about ten gr
blue mass rubbed up in two drachms of syrup of rhubarb, to w
added one half teaspoonful of paregoric, and four ounces of cha
ture. Of this the dose is a teaspoonful every two or three hours
Parker says that the "blue mass certainly does not act like th
mel, not producing in purgative doses so great prostration, and i
doses it does not lessen the proportion of fibrin in the blood, as
case with calomel." Dr. Smith's comment on this is: "I have
used this mixture, having been generally satisfied with the eff
the castor oil mixture."

It is unnecessary to say any more upon the use of mercurials, and pecially of calomel. We have quoted enough to show that our own pinions find us in very good company.

We regard *opium* as one of the most valuable remedies we have in e treatment of this disease. In a former edition of this work it was tated that some writers objected to its employment in the early stage s injurious, but that we had not been deterred from using it, except cases presenting manifest signs of cerebral irritation in connection ith the febrile symptoms; but that when there has been nothing more han irritability, restlessness, and insomnia, when there was evident ain during the discharges, and when the latter have been very frequent, we had always made use of some of its preparations without esitation, and certainly without injury, but, on the contrary, with ery great benefit. Our longer experience confirms us in this view nd practice. The propriety of using large doses of opium in the early tages of cholera infantum may well be questioned, as it has come to e by some of the best observers in Asiatic cholera; but this matter ill be considered under the head of that disease. In the disorder under onsideration, which is one of an inflammatory catarrhal type, we have ever seen the moderate use of opium do anything but good. When he nervous symptoms are very marked, if they be of the kind which enotes disturbance of the reflex functions of the nervous system rather han those indicating cerebral disorder, we find nothing which answers o well our purpose as this remedy. When, however, there is unusual uiet, tending towards drowsiness or stupor, with contraction of the upils, we make use of it only with great caution and in very small oses. We are glad to find that Dr. Stokes also employs opium without hesitation. He says, "It is a remedy that requires caution in its xhibition, but one of great utility." It generally lessens the number f discharges, and very often diminishes the heat of skin and frequency f the circulation, by allaying the irritability of the nervous system, while at the same time it greatly promotes the comfort of the child. We have used it in the form of laudanum or paregoric, given in combination with a laxative early in the case, or by enema, and afterwards n that of the Dover's powder or powdered opium. For a child under ix months old half a drop of laudanum is enough to give by the mouth. Of the Dover's powder about a sixth or eighth of a grain may be administered mixed with two grains of chalk, to be repeated every two or three hours until three or four doses have been taken, or until the child shows some degree of drowsiness from the action of the opium, after which it ought to be suspended for six or eight hours, and then resumed. Or the opium may be given in the form of laudanum combined with the sulphate of magnesia as recommended above. The old-fashioned castor oil emulsion, in the proportion of one drachm in a one or two-ounce mixture, with half a drop of the deodorized laudanum to each teaspoonful of the mixture, is often very soothing and beneficial. When there is marked tenesmus, with frequent small evacuations, opium may also be used with great advantage by the rectum, either to the exclusion of any in the mixture, or in addition to that, taking care to graduate the quantity by the degree of drowsiness that may be induced. At one year two drops in one or two teaspoonfuls of water or thin starch-water may be used two or three times a day. In such cases, suppositories are sometimes retained better than enemata. A twelfth to a sixth of a grain of powdered opium, made up with cocoa butter, may be given instead of the injection.

Generally speaking the acute constitutional symptoms either subside or disappear under the above treatment, and very often the diarrhœa also ceases and the child recovers. When, however, the diarrhœa persists, it is necessary to resort to two other classes of remedies, upon which great reliance is placed in the treatment of this affection. These are *astringents* and *absorbents*, of which the most important are prepared chalk, powdered crab's-eyes, bismuth, acetate of lead, rhatany, kino, and catechu. The chalk may be used in the form of the officinal mistura cretæ, a teaspoonful of which is given after each loose evacuation, or several times a day. When the case is severe, the efficacy of this remedy is much increased by the addition of tincture of krameria, in the proportion of a drachm to two or three ounces of the mixture, of some opiate preparation, or of ten or fifteen drops of the aromatic syrup of galls (to be described presently) to each teaspoonful. Chalk may be used also with great advantage, as stated above, in powder, combined with Dover's powder.

The powdered *crab's-eyes* will sometimes arrest cases in which prepared chalk fails to produce any effect. It is generally employed in mixture. The formula we employ is the following:

℞.—Ocul. Cancror. Pulv., ...	ʒj.
Pulv. Acaciæ, ...	ʒij.
Sacch. Alb., ...	℈j.
Aquæ Fontis, Aquæ Cinnamom., āā	f℥iss.—M.

A teaspoonful to be given four, five, or six times a day.

M. Bouchut recommends the following prescription of Hufeland's:

℞.—Ocul. Cancror. Pulv., ...	gr. x.
Aquæ Fœniculi, Syrup. Rhei, āā	f℥ss.—M.

Give a teaspoonful every hour.

Subnitrate of bismuth has been highly recommended, for a number of years past, as a remedy in diarrhœa. Dr. Woodward (*op. cit.*, p. 258) quotes Assistant-Surgeon Dr. John B. Trask, U.S.A., as lauding it very highly in the chronic diarrhœa of the armies during the late war, and in California and Oregon, especially in those cases in which there is nausea or other disorder of the stomach. Dr. Woodward states that "he has given it a fair trial, and while he is far from regarding it as a specific, believes it to be a most valuable article in both simple, irritative, and in chronic diarrhœa." Dr. Trask prefers to give the whole quantity for the day in a single dose; but Dr. Woodward states that does not correspond with the general experience on the sub- may be given in doses of one to two grains, to children one every two or three hours. It can be administered in powder r alone, or combined with prepared chalk, or in mixture with rup, or ginger or acacia syrup, and some aromatic water. We loyed it quite frequently, but, on the whole, have not found it e as we had been led to hope.

of lead has been highly extolled by many writers in the treat- he diarrhœas of children. We have had but little experience and are, therefore, unable to offer an opinion in regard to the which it may exert. It may be given in doses of from a sixth hth of a grain, alone, or combined with chalk or Dover's very two hours. *Krameria*, *kino*, and *catechu* may be exhibi- , in the form of infusion or solution, or they may be given in on with the chalk mixture. We have frequently employed ure of krameria in the latter way, and believe it adds very the efficacy of the remedy. About one or two drachms may to two ounces of the mixture, and the usual dose given. We l, with much advantage, either alone or with chalk or crab's- ture, an aromatic syrup of *galls*, in the dose of from fifteen to ps three or four times a day, or, when the discharges are very every two or three hours. It is prepared according to the formula:

-Gallæ Opt. Pulv., ...	℥ss.
Cinnamom. Pulv., ...	ʒij.
Zingib. Pulv., ...	ʒss.
Spts. Vini Gall. Opt., ...	Oss.—M.

ingredients stand in a warm place for two hours, and then burn off the lding some lumps of sugar in the flames. Strain through blotting-paper.

erle (*loc. cit.*, p. 221) highly recommends the root of the *maculatum.* He says it makes an "agreeable and efficient t," and is less apt to derange the digestive organs, and occa- ation of the mucous membrane of the bowels, than kino. He the form of a decoction made with milk, by boiling an ounce esh root in a pint of milk until half is evaporated. The dose a teaspoonful to a tablespoonful four or five times a day, g to the age of the patient.

itrate of silver is highly recommended as a remedy of late years al writers. It is given both internally and by enema. The f administration will be described in the remarks on the treat- the chronic form of the disease.

ives are often of much service in the treatment of this, as of ll the diseases of childhood. When there is much restlessness ability, with heat of the head and trunk, and coolness of the ies, it will be found that mustard foot-baths, or sinapisms to emities, often allay these symptoms, and greatly comfort the tient. When the abdomen is tense and painful, and the discharges preceded or accompanied by movements or crying indicative of pain, the application of a poultice of mush and mustard from time to time, to be followed by a simple mush poultice, sometimes acts very usefully.

Tonics and *stimulants* are often necessary in weak and delicate children from an early period in the attack, and in those who are stronger, after the disease has lasted for some time, and the acute symptoms have ceased, and been followed by weakness and exhaustion. The best tonic is, probably, *sulphate of quinine*, in doses of from a quarter of a grain to a grain three times a day, continued for one, two, or three weeks if necessary. Old *brandy* has answered better in our hands as a stimulant, than wine, wine-whey, or any of the tinctures. It may be given to the youngest children in doses of from five to ten drops every two hours, or a teaspoonful may be added to a wineglassful of sweetened water, and a teaspoonful given whenever the child will take it. We have been obliged, in several cases, to continue the use of the brandy for three, four, and five weeks. At the time when we are obliged to resort to this class of remedies, it is almost always necessary also to pay attention to the improvement of the diet. The proportion of milk to water ought to be increased, if it has been small heretofore; and we should employ every means to induce the child to take a sufficient quantity without overloading the stomach. At this stage small quantities of animal broths are proper, or the child may be allowed to suck pieces of juicy meat, or to eat very finely minced meat of chicken or mutton. The diet is in fact a most important part of the treatment at this period. Dr. Stokes says of it, that "many children are lost by the practitioner neglecting this point."

Occasionally, indeed quite frequently, vomiting becomes a most troublesome symptom in entero-colitis. When it occurs at rare intervals, and without much distress to the patient, it needs no attention, since it is to be supposed that the physician has already arranged the hygienic and therapeutical treatment so as to suit the ordinary conditions of the disorder. But when vomiting becomes frequent and violent, so that the child rejects a large proportion of all that is given to it, and when, between the acts of vomiting, the little thing refuses almost everything that is brought to it, all its usual foods, medicines, and sometimes even water, it is evident that the child has a more or less positive sense of nausea which causes loathing of food, and the symptom becomes a serious complication which requires special attention and treatment. In such cases, there is no use in forcing food or drugs which it loathes upon the child, unless all other means have failed, when of course, we must attempt to make it take concentrated foods in small doses. The better plan, at first, is to change the diet in toto—to abandon milk and all its preparations for two or three days, if these excite disgust—and give light beef or chicken tea, just touched with salt, or raw beef, or, if this also is refused, cold extract of beef in one or two tablespoonful or wineglassful quantities, or pieces of juicy and rich beef very slightly cooked, to be sucked. Or we may y small portions of yelk of egg, hard boiled, or what we have ten found was eagerly taken in such conditions, wine-whey, of hich we have given, in the second year of life, as much as a tumerful in twenty-four hours, and this without the slightest effect of ndue stimulation, febrile heat, or excitement. Sometimes, when the ild refuses its ordinary milk persistently, or vomits it so soon as ken, it will drink willingly, and retain very well, lime-water and ilk, in the proportion of one of the former to two or three of the tter, with just enough brandy to change the taste. We know that me medical men object entirely to the use of stimuli in children on wo grounds: 1. That alcohol has no remedial power whatever, or that is positively injurious in all cases. 2. That its use tends to produce at pernicious taste for stimulants which engenders the habit of drunknness. To the first objection we can only reply that our observation nd experience have led us to a different conclusion, and that, when mployed in certain conditions of the vital powers, which we have arefully endeavored to describe, stimuli are of the highest value as a herapeutic means. To the second we reply that we have never, so ar as very careful observation goes, produced a drunkard by any use e have made of them. We agree that physicians ought to be very areful not to employ them in any attractive form, as a long-continued emedy, in children over six or eight years of age. When we desire o use any form of alcohol in a chronic case in children over the age entioned, we always give some of the bitter tinctures or elixirs. When possible, we always order the oldest and most delicate brandy hat can be procured. As to the quantity, this must depend on the ge of the patient, the instinct and idiosyncrasy of the child, and the egree of severity of the case. At the age of six months, from ten to fteen drops may be given every two or three hours in two or three unces of the lime-water and milk; and at one and two years, from wenty to twenty-five drops in from four to six ounces of the milk food very two, three, or four hours. It may be a sign of the old Adam in he poor little sufferer, but we have often known children to take, for ays together, milk with brandy in it, who would not touch the milk without this addition. We cannot but think that in such cases it is an nstinct for a useful agent, like the appetite of patients in typhoid or typhus fever, in certain of their phases, for wine or brandy, which disappears when the necessity for it passes away, as has been so well described by Dr. Corrigan, of Dublin, in his able little essay on the treatment of Irish typhus.

Under these circumstances, all medicines which disgust the child must be laid aside. A bitter, or nauseous, or gritty dose will, in such states, surely cause vomiting, as will, in older persons, under such conditions, an odor or taste, or even an idea. We have seen a little infant, sick with diarrhœa, who was sitting languidly upon the floor, made to gag and retch, by chancing to pick from the floor a piece of softened bread. The impression produced upon the tactile sense of the fingers by the wet and mushy substance caused sickness at once, as the filing of a saw sets the teeth of a delicate nature on edge, and brings water the mouth. All offensive and bitter doses must be abandoned there We have often used, in such cases, the following prescription with m benefit:

℞.—Liq. Morph. Sulphat., ...	♏xxxij.
Acid. Sulph. Dil., ...	♏xv.
Curacoa, ...	fʒij.
Aquæ, ...	fʒxiv.—M.

Dose, a teaspoonful every hour or two hours, at the age of six months to a ye

For older children, the proportions of the opiate and acid mus increased. When the nausea subsides or passes away, or when child becomes drowsy, the intervals between the doses must be len ened, and as the symptoms disappear, the other remedies necessary the diarrhœa may be resumed, and so too of the food. Dr. J. L. Sm of New York, states that the best remedy he has used for vomitin the neutral mixture, as follows:

℞.—Potass. Bicarbonat., ...	gr. xxv.
Acid. Citric., ...	gr. xvij.
Aquæ Amygd. Amar., ...	f℥j.
Aquæ, ...	f℥ij.—M.

One teaspoonful to a child from eight to twelve months old, repeated accordi the nausea or vomiting.

Creasote is also sometimes very useful. Dr. Smith says that in Nursery and Children's Hospital of New York, this remedy is u given in the proportion of an eighth of a drop in a teaspoonful of l water, in a teaspoonful of milk or breast-milk, and has been found cessful in a certain proportion of cases.

TREATMENT OF CHRONIC ENTERO-COLITIS.—The management of hygiene of the patient is more important than any other part of treatment, in this, as in nearly all the diseases of the digestive org in children; for cases will often recover when the diet, drinks, and ercise are properly regulated, without the use of any drugs whate whereas, most assuredly, but a small proportion of them would term ate favorably under the best and wisest therapeutical medication, w the hygiene of the child neglected. The remarks that have been m as to the diet most proper in the acute form will apply here. If child have been weaned only a few weeks before the time at which are consulted, and the case is at all serious, it is better to advise procuring of a wet-nurse. We have several times known cases of disease which had resisted the most carefully managed artificial and therapeutical treatment, recover in a few days after the child been restored to the breast. It is often, however, impossible to fol this course, from the refusal of the parents to obtain a nurse, or of child to take the breast of a stranger, and we are obliged to rest tent with artificial food. We believe that the kind of diet which s the largest number of children is one of milk. During a numbe

ady for use. The whole preparation should occupy about fifteen
s.

n cow's milk, mixed with water alone, or prepared in the man-
st recommended, evidently disagrees, we have sometimes found
with water alone, or better still, with the solution of gelatin in
in the proportion of one part of cream to five or six of the latter,
very well. In other cases very carefully prepared beef tea or
n or mutton water, given several times a day or but once, accord-
the taste and fancy of the child, will answer better. It some-
happens that the child will refuse everything that has been men-
and yet the prostration and emaciation are such as to make it
al to procure some aliment that it will consent to take. We have,
such circumstances, given small portions of bread and butter, or
ponge-cake, with weak brandy and water, if the child is old
to swallow solid food. Sometimes it will eat small quantities
t, and when this has been the case, we have not hesitated to allow
ken-bone, with a little meat attached to it, or a piece of ham,
er still, a portion of roast beef, or of the tenderloin of beef-steak,
held in the hand and sucked; or we may give the white meat of
n cut up very fine, or torn into the finest shreds. Of the latter
a teaspoonful is sufficient for the first day, given with a little
and water. The quantity can be gradually increased afterwards.
ve of late years also given small quantities of raw beef in many
minced very fine and flavored with salt, or prepared in the man-
scribed below,[1] and have found it to be readily digested and to

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use of raw meat in the diarrhœa either of infants deprived of their mothers'
r of weaned children, was recommended by Weisse, of St. Petersburg, as long
1840 (Oppenheim's Journal). Of late years it has been extensively used with
nt results, and is highly praised by Trousseau and other eminent authorities.
ministration of the muscular tissue itself appears much more useful than any
f beef essence or soup, probably for this reason among others, that these fluids

agree well with the little patients. There is another article whic have sometimes given when children have been exhausted for wa food, and when they require constant change in order to be tempt take it. This is the yelk of a *hard*-boiled egg, which has the adva of being very nutritious if digested, and of not being injurious sl it happen to pass into the bowel in the crude state, as it falls ir state of fine powder, which is not irritating to that organ,

The quantity as well as character of the food is of the utmost ir tance, and should be strictly regulated by the physician, and atte to by the mother or nurse. As a general rule the child may be all as much as it wants of proper food, since the appetite is almost al greatly diminished, and it is not likely, therefore, that too much w taken. If, however, there is disposition to nausea or vomiting, the appetite remain as good as usual, the quantity must be restri The difficulty in most cases is to get the patient to take enough, an to prevent it from taking too much, for we have very often ascerta upon careful inquiry, that the quantity was entirely too small to port the strength of the constitution. A hearty child six month fed solely on artificial food, will generally take a quart of food i twenty-four hours, while at a year old it will take usually fully a or three pints of fluid nourishment, besides eating small quantiti solid food. Now, we have frequently known children laboring u chronic entero-colitis, not to take more than one or two gills of fo the day, which is manifestly much too little. When this is the therefore, we should always endeavor to stimulate the appetite an gestion by means of tonics and stimulants, and by causing to be sented to the child such a variety of food as may entice it to ta larger quantity than before.

In connection with this most important matter of the food, we again quote from Dr. S. B. Hunt (*op. cit.*, page 305), to show the re of his experience in the use of foods in chronic inflammatory diar in the army. For the sake of any non-professional reader, we will that by albuminoid food Dr. Hunt refers to meat, meat-broths, &c ; and by antiscorbutic food he means tomatoes, fresh fruits, on &c. Dr. Hunt says: "The value of drugs was, perhaps, overestim in this, as in all other diseases of assimilation, and only a careful a ance of the original causes of the malady, and an equally careful r

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first, even when the nature and abundance of the diarrhœa have already unde a favorable change.

In a second article upon this subject (Jour. für Kinderkranheiten, Januar February, 1858), Weisse calls attention to the fact that in many children wh been treated by raw beef, tapeworms have been developed. As these worms all specimens of tænia solium, which is not indigenous in St. Petersburg, it is able, as suggested by Von Siebold, that they had been conveyed in the undeve state in the flesh of oxen, brought from distant points. We are not aware th unfortunate consequence has been observed frequently in other localities, an tainly in the quite numerous cases in which we have ourselves administere meat to children, no entozoa have been developed.

tion of their continued existence in the system, could secure any de-
ee of success. The scorbutic and malarial taints were almost uniformly
cept, the former very frequently in as pronounced a form as the
tter. The bowels, enfeebled by the inflammatory process, were un-
le to perform their normal function of the digestion of starches, and
e diet, therefore, became necessarily albuminoid. A full nutritious
et of albuminoid and antiscorbutic food assumed the first importance
the treatment. Coupled with this came pure air and absolute cleanli-
ss. And, with these hygienic measures alone, when they could be
operly enforced, it was possible to treat chronic diarrhœa and dysen-
ry with a fair degree of success, even in the great heats of a Southern
mmer." These views confirm what we have said above, that milk,
eat, raw or cooked, broths, eggs, gingerbread, tomatoes, bread and
tter, and we may add currant-jelly, make the best food for children
er two and three years of age. Even in children of eight months
nd a year or upwards of age, milk and beef or chicken tea ought to
rm the chief diet. The starches, such as arrowroot, barley, wheat
reparations, &c., do not answer, except in very small quantities cooked
milk. We saw one child, a year old, weaned in August in conse-
uence of the illness of the wet-nurse, whose life was apparently saved
dysentery by Liebig's cold extract of beef, and by its fortunately
aving developed a strong taste for the sucking of large pieces of rap-
dly and slightly cooked beefsteak.

The *therapeutical treatment* of the chronic form consists principally in
he administration of tonics, astringents, and absorbents. Of these the
ost important are the bismuth, powdered chalk and crab's-eyes, and the
ifferent vegetable astringents, which have already been noticed in the
emarks on the acute form. These are to be given in the manner there
ecommended, and it is therefore unnecessary to repeat what has already
een said. In addition to these there are some remedies which are par-
cularly adapted to the chronic form of the disease. Amongst them
nitrate of silver. Dr. Eberle (*op. cit.*, p. 251) says he has found its
ternal administration to produce the happiest effect in a few in-
tances. His prescription was a grain of the nitrate dissolved in an
unce and a half of gum arabic water, with the addition of twenty
rops of laudanum. The dose was a teaspoonful three times a day.
He adds that he has never "known the slightest inconvenience to re-
ult from the use of this article in chronic mucous inflammation of the
owels, when administered in a mucilaginous solution and in very small
oses." It has been much used of late years in France. MM. Trous-
eau and Pidoux recommend its internal use in the chronic diarrhœas
f children occurring during dentition, after bismuth, powdered crab's-
yes, and diet have failed to effect a cure. Their formula is as follows:

℞.—Argent. Nitrat., ... gr. ⅕.
Aquæ Destillat., ... f℥vj.
Syrup. Sarsap., ... f℥ijss.—M.
To be given in eight or ten doses.

t the same time, they employ an enema composed of a grain of the

nitrate in three ounces of distilled water. It is highly recomm
also in these cases by Hirsch, of Königsberg. His formula is as fo

℞.—Argent. Nitrat. Crystal.,	gr. ¼.
Aquæ Destillat.,	f℥ij.
Acaciæ Pulv.,	℈ij.
Sacch. Alb.,	ʒij.—M.

A teaspoonful of this mixture to be given every two hours, a
enema, consisting of a quarter of a grain of the salt, with mu
and a little opium, to be administered (*Rankin's Abst.*, No. vi, p
We have employed this remedy in the proportion of from half a
to a grain in a gill of water, by injection, morning and evenin
several days, with very decided benefit, in three cases of diarrhœ
lowing summer-complaint, in which the stools were frequent, mu
sometimes streaked with blood, and accompanied by tenesmus.
have also given it quite frequently internally in mucilaginous sol
as above recommended, with excellent results.

Dr. Woodward (*op. cit.*, p. 264) says, in his article on the treat
of the chronic diarrhœa, which was a true entero-colitis, that "
the most valuable local measure is the employment of solutions
mineral astringents as enemata." He mentions sulphate of copp
trate of silver, sulphate of zinc, and acetate of lead, but thinks
the sulphate of copper and nitrate of silver are probably the mo
cient. The strength he recommends is of one or two grains
ounce of water, of which from one to six ounces may be throw
the rectum two or three times a day. He advises that, whe
rectum rejects the injection immediately, twenty to forty drops of
anum be added to each enema, that the injection be thrown car
into the bowel, and the nozzle of the syringe be withdrawn as
as possible, in order that the fluid may be retained at least for
little time. We quote these statements, not to induce the use, in
dren, of solutions of one or two grains to the ounce, but to draw
tion to one of the means, the ability and advantage of which bo
test of the vast army experience in this most severe and troubl
disease. In children it is best to begin with a grain to four o
and, if this gives no pain, or but little, and does not produce the
for benefit, the proportion may be doubled, or, after two or three
brought up to that of a grain to an ounce.

Another excellent remedy in the chronic diarrhœas of childre
from which we have sometimes obtained very satisfactory effects,
syrup of the *nitrate of iron*. It is given in doses of from two to five
three times a day, in sweetened water, at the age of one or two

The following formula is recommended by Dr. Eustace Smith.
have used it ourselves in several chronic cases, and have been
pleased with its effects:

℞.—Liq. Ferri Pernitrat.,	fʒss.
Acid. Nitric. Dil.,	fʒss.
Syrup. Zinzib.,	f℥j.
Aq. Anethæ,	ad f℥iij.—M.

A teaspoonful every six hours at one year of age.

in the highest terms of the efficacy of sulphuric acid in diar-
He thinks that he has succeeded in establishing beyond cavil or
"the almost specific effect of sulphuric acid in all cases of diar-
I say in all cases of diarrhœa, and in diarrhœa only, for I hold
ss reliable, and even frequently injurious, in dysentery." He says,
ng of adults, that "the majority of cases were cured in 24 or 48
; few required the use of it for four days, and only a very small
r took it as long as eight days; they got nothing else, and were
" He also states he "could successfully prove, that in the much
stly dreaded summer-complaint of children, in cholera infantum,
much preferable to the mercurial, chalk, astringent, and opium
nent; it is even more rapid and more positive in its effects with
en than with adults."

dose he gives to adults is usually half a drachm of the aromatic
ric acid every four hours, and he remarks that from four to eight
generally sufficed to effect a cure. His usual formula (for adults)
ollows:

℞.—Acid. Sulph. Arom., ... f℥ss.
Tinct. Cardamomi Comp. (or Sp. Lavandulæ
Comp.), Syrupi Simp., āā, ... f℥j.—M.

ose is printed two *tablespoonfuls* every two hours, but this must
error of the printer; two *teaspoonfuls* must be the dose intended.
ere be tormina, feeble pulse, general prostration, I added aq.
oræ, f℥j, and gave it in shorter intervals." Dr. Pollak adds, that
first dose is almost invariably ejected, probably from its suddenly
ging the stomach. I then ordered iced water to drink *ad libitum*,
er to soothe and distend mechanically the stomach; had the dose
ted immediately, and have never seen it returned afterwards."
ollak does not inform us of the doses he employs in the case of

℞.—Acid. Sulph. Arom.,	gtt. xlviij.
Tinct. Opii,	gtt. xij, vel xxiv
Syrup. Krameriæ,	f℥ss.
Aq. Fluvial,	f℥ijss.—M.

A teaspoonful every two hours.

It should never be forgotten in the treatment of chronic diarrh children, that the most important point of all is the regulation diet and other hygienic conditions. We are fully convinced th have seen several children saved from death by attention to points, and by the persevering and careful employment of tonic stimulants. It often happens, after the disease has lasted for weeks or months, that the powers of the stomach are almost w lost. The child either refuses food or takes so little that the qu is evidently insufficient to carry on the vital processes, or the g part of what is taken is rejected by vomiting, or lastly, much passes off through the bowels, and appears in the stools in an gested state, forming what is called lientery. If this condition of is allowed to continue, the emaciation and exhaustion make rapid ress, and the case must soon terminate fatally. Under these ci stances all the ingenuity and skill of the physician are required t articles of diet of a kind to recall and tempt the child's worn-o often perverted appetite, and which, at the same time, may be ible and nutritious, and tend to restore vigor to the digestive fun If the stomach is frequently sick, it is best to abandon all remedi those which are stimulating and strengthening, and especially to all such as are in the smallest degree nauseous. We would inde pend entirely on the use of repeated doses of the oldest and mos cate brandy that could be found, of which from one to two teaspo may be put into a wineglassful of cold water, and the whole giv teaspoonfuls in the twenty-four hours; or fifteen to twenty drop of the elixir of Peruvian bark every three or four hours may be or solution of pepsin, in half teaspoonful doses three times a da two or three drops of tincture of nux vomica in sweetened water times a day, if the bitterness does not cause nausea or increa loathing. In such cases, wine of iron, in doses of twenty drop fourth of a drachm, with syrup of tolu and caraway water, will times do exceedingly well; or the following, which has sometime ceeded in our hands:

℞.—Tr. Ferri Chlorid.,	fʒj.
Acid. Acet. Dil.,	fʒj.
Liq. Ammon. Acetat.,	fʒij.
Syrup. Simp.,	f℥ss.
Aquæ,	f℥ij.—M.

Dose at four years, a teaspoonful, and under that age, half a teaspoonful, four times a day.

In some very obstinate cases, especially where there is any to suspect the existence of a malarial element in the case, from be carried so far as to induce positive fatigue, are all-important. e very severe and tedious cases, change of residence or travelling en known to effect a cure after all remedies and other means had In one case, in this city, which had lasted with but short in- for two years, we obtained a perfect cure by persuading the s to send the child into an elevated part of the country in the of May, where it was kept until July, after which it was removed seaside until the end of August. Nothing was done in the mean- xcept to regulate the diet most carefully, and to keep the child eater part of the day in the open air.

ARTICLE III.

CHOLERA INFANTUM.

ERAL REMARKS.—In the early editions of this work we failed to with sufficient clearness the distinction between what we think exclusively to be called cholera infantum, and the much more on disorders which are properly styled simple and inflammatory œa or entero-colitis. In this we did but follow the practice of American writers, and the custom of the day. Indeed, many cians amongst us are still in the habit of designating the various inal disorders of children so frequent during the summer heats, the common title of cholera infantum. We believe, on the other that a large majority of the deaths registered in our mortality s under this name, are the result not of a true choleraic disease, ther of simple diarrhœa or entero-colitis. We have, however,

in young and generally teething children, who have been
viously either healthy or the subjects, for a longer or shorter tim
simple or inflammatory diarrhœa, of sudden muscular debility,
sional nausea, spasmodic griping pains in the bowels, depression o
functions of respiration, and an appearance of faintness; copious p
ing of thin serous fluid, or of large watery and fetid evacuations,
ceeded by more or less obstinate vomiting, coldness and dampness
part or of the whole surface of the body, coldness and lividity of
lips and tongue, cold breath, a craving thirst, a feeble rapid pulse,
cult and oppressed respiration, with extreme restlessness, dimini
or suppressed urinary secretion, pallor of the entire surface of the b
a sunken and pinched countenance, weakness of the cry or pa
aphonia, and collapse, more or less complete, which may prove fata
be followed by reaction and a subsequent more or less severe and
stinate simple or inflammatory diarrhœa.

This disease is not so common as simple and inflammatory diarrh
most cases of which have been hitherto, as stated above, improp
grouped under the common name of summer complaint. Though
in Europe, in comparison with its frequency in this country, it is
to recognize from the descriptions, the identity of some of the
called by Billard follicular enteritis, by Barrier apyretic and febrile
licular diacrisis; by Rilliet and Barthez, in their second edition, ch
iform gastro-intestinal catarrh, and by Copland, the choleric fev
infants, with the true cholera infantum of America.

It is impossible to determine its real frequency amongst us, for
reason that fatal cases of simple diarrhœa and entero-colitis, ar
generally included in our mortality returns, with those of the
choleraic disease, under the common title of cholera infantum, or
mer complaint. That it is a frequent cause of death is shown,
ever, by the tables of Dr. Emerson (*Am. Jour. Med. Sciences*, v
1827), wherein it appears that from 1807 to 1827, 3576 deaths
cholera, under five years of age, were returned in this city; of co
many of these deaths were from a true choleraic disease. This is
largest number of deaths from any one disease given in the table.
next largest item of mortality is under the head of convulsion
which it appears that 3192 died in the same period of time. Du
the five years, from 1844 to 1848 inclusive, there occurred in this
18,599 deaths from all causes, under fifteen years of age. Of this t
1611 died of the so-called cholera infantum, which is the largest n
ber of deaths from any one disease, with the exception of convulsi
Of convulsions there died 1729. After cholera infantum the lar
number of deaths was caused by marasmus (1060), dropsy of the b
(1041), pneumonia (772), and croup (756). Cholera infantum, th
fore, in these tables, causes nearly as many deaths as convuls
during the first fifteen years of life, and rather more than twic
many as pneumonia. We also refer the reader to the table give
pages 386–387, obtained from the Board of Health of this city, ex
iting the mortality under five years of age from cholera infantum,

with greater intensity. When that cause, or those causes, what-
ey may be, act with moderate force, the result will probably be
e or inflammatory diarrhœa. When, on the contrary, the causes
nsified in degree, the case will be apt to take the form of chol-
isorder. Thus, *heat* is one of the most influential of these causes.
as the atmospheric temperature is moderate, the resulting dis-
will probably take the form of simple or inflammatory diar-
But let the temperature rise to 85° or 95° Fahr., or even higher,
ens occasionally in our summers, and continue at that height
e or four days, and children previously well, will be seized with
e choleraic forms of diarrhœa, whilst those who are already suf-
with simple or inflammatory diarrhœa, are prone to have these
diseases assume suddenly the choleraic type.

nce at the table above referred to, shows most plainly the effect
upon the mortality from bowel diseases in children, under five
f age. It will there be seen that, in the two months of July
gust, when the mean monthly temperature is between 75° and
e mortality from cholera infantum rises to between two and four
d, and even over; whilst during the cool months, as January,
ry, November, and December, when the mean monthly temper-
s between 30° and 40° generally, only one, two, three, or none
re reported. This table shows also, what we have so frequently
ed upon, that most of the fatal cases of bowel disease in early
classed in the medical returns of this city, under the common
cholera infantum, whereas, we are sure from our own personal
nce, that many of these deaths would be more correctly referred
ple or inflammatory diarrhœa, or entero-colitis. Thus, in the
onths when three and four hundred deaths are grouped under the
cholera infantum, only from fifteen to twenty, or a little over,
usually under the term diarrhœa.

—Improper diet is another frequent cause of choleraic disease dents or imprudences in large cities, where the hygienic conditions always in summer of a kind to invite the more violent and danger forms of intestinal disorder. In fine, the conditions which have be ascertained to be most certain to produce epidemic cholera, when th disease is present in a locality, are those which develop cholera in ch dren. To put before the reader the conditions most certain to cau cholera in children, we cannot do better than to quote from the *Rep on Epidemic Cholera to the Citizens' Association of New York in* 1865, t *localizing* causes of cholera.

These are:

1. Decaying organic matters, bone, hide, fat and offal houses, ne lected stables, putrescent mud and filth.
2. Bad drainage, local dampness, malaria.
3. Obstructed sewers, filthy streets, gutters, stables, garbage, a cesspools.
4. Water and beverages in any manner contaminated by putresc organic matter, particularly by any soakage from privies.
5. Neglected privies and putrefying excrement.
6. Overcrowding and neglect of ventilation.

It is just where these conditions are most rife that choleraic disea in children are most apt to occur. Amongst the poor, who inhabit t crowded quarters of cities, where the streets and alleys are small a narrow, where heaps of decaying vegetable and organic matters abou where water is scant or scantily used, where ventilation, from the mann in which the streets are laid out, and from the crowding together buildings, is necessarily imperfect, we have the most numerous and t severest forms of the disease. Add to these the small size of t houses, the low ceilings, the small and few windows, and the inter arrangement of the rooms, which is such that a thorough draught unattainable, and we need not wonder at the prevalence of the disea It is amongst the poor, too, that the food is often of necessity, as w as from ignorance and recklessness, of the most improper kind, and unfrequently, insufficient in quantity.

But not only the poor, in their unhappy lot, suffer from this disea The children of the rich, with all the advantages of the most who some hygienic appurtenances which ease and knowledge can supp are apt to contract it if they remain in town during the hot summ months. So well is this known, that most families in easy circu stances leave the city for the seaside or the interior, so long as th children are young, remaining absent usually from the middle of Ju to the middle or end of September. It is nevertheless true that, whi all the residents in our cities during the summer season are liable see their young children suffer from this disease, those who are so f tunate as to occupy large and airy houses in the best and clean quarters, and who follow a wise system of hygiene as to diet, wat dress, and exposure to fresh air, escape with much more certainty disease than those who are compelled by the necessities of their p tion to submit to the unhealthy conditions mentioned above.

Dentition.—We believe this also to be a most powerful predisposing ause of the disease, and yet it would seem to be less influential than ge, for the tables of Dr. Emerson show that it is about twice as fatal the first year as in the second, though the process of dentition is cer- ainly more active and continuous in the second than in the first year. We have rarely observed it before the beginning of the process of den- ition, and it is certainly very rare after its completion.

Age, as has just been stated, exerts a strong influence in the produc- on of the disease. In the tables of Dr. Emerson, the cases of cholera fantum and cholera morbus are included under the one head of holera, but as all cases of the disease under five years of age are alled cholera infantum, the want of the distinction does not make the tatements less useful to us. From them it appears that there were 122 deaths in the first year, 1186 in the second, and only 268 between he second and fifth. Between five and ten years, only 52 cases are oted, and these would of course be entitled cholera morbus. In the ve years, from 1844 to 1848 inclusive, of 1611 deaths from cholera in- antum under 15 years of age, 969 occurred in the first year of life, 29 in the second, 103 between two and five years, and only 10 after hat age.

Sex.—There are no large tables of reference, by which to ascertain he exact proportion in which the disease occurs in the opposite sexes. t would appear, however, from our own experience, to be much more ommon in males than females, since of 77 cases of which we have kept record, 48 occurred in boys, and only 29 in girls.

Constitution.—The disease is most apt to occur in feeble, delicate chil- ren, and in those of nervous, irritable temperament.

Hereditary Predisposition.—Our own observation leads us to believe hat the disease is apt to occur in certain families. It would seem robable that this peculiarity must depend on the fact that the consti- utions of some families are particularly disposed to disorders of the igestive apparatus. We are acquainted with one family in this city, n which eight out of ten children, suffered more or less from the dis- ase. Again, of these children four have grown up, married, and have hildren. Two of these families have each lost a child from the dis- ase; in a third, the two children of the family have been exceedingly l with it; while in the fourth, some of the children have been sick, hough not to the same degree. Again, we have attended two children n a family, one not quite two years, and the other three months and a alf old, who have both been very sick with the disease. The elder hild was ill the summer before in the same way. The mother of these hildren was herself very ill with the disease on several occasions dur- ng her infancy, as was also her brother.

Anatomical Lesions and Pathology.—It will be readily under- tood that it is far from an easy task to define precisely what are the ssential lesions in true cholera infantum, as we have described it. Having been confounded so long with ordinary inflammatory diar- hœa, the lesions usually attributed to it are precisely those we have detailed in our article on the latter affection. In those cases where the true choleraic disease appears during the course of infl tory diarrhœa, it is of course difficult to determine to which af the lesions presented after death are in reality due. We must, fore, seek for the true and proper lesions of cholera infantum comparatively rare cases in which this affection has appeared midst of good health, and has proved fatal during the acute With this restriction then, it appears that the only anatomical c which can be regarded as constant and essential to the disease, largement of the mucous follicles, and, to a less degree, of the gla Peyer; and softening, and in some cases erythematous inflamma the mucous membrane.

There can be little doubt that the appearances thus indicat pend upon the presence of an early stage of inflammation of the of the intestinal walls, and of the mucous follicles. This view ported by the similarity between these lesions and those found i of entero-colitis, proving fatal during the early stage, as well as fact that where the child survives the choleraic stage, and ulti dies after a continuance of diarrhœa for some days, or even weeks, the lesions are found to have developed into those ordi found in primary entero-colitis.

It is, however, necessary to consider briefly what additional el is present, in this form of disease, which impresses upon it such liar and fatal features; or, in other words, what is the pathology collapse which characterizes cholera infantum.

It is a matter of much regret, that as yet we are wanting in microscopical examinations of the condition of the epithelium mucous membrane, and of the characters of the evacuations should anticipate, however, from the evident similarity b cholera infantum and sporadic cholera, or cholera morbus in the that in the former as in the latter disease, such examination reveal rapid proliferation and exfoliation of the cells of the m membrane.

In regard to the explanation of these lesions, we would ref reader to the remarks upon the pathology of entero-colitis, wh have expressed our belief that the causes of these affections noxious emanations, unwholesome food), act in a complicated m by inducing a state of mal-nutrition in which the tissues are pr undergo inflammatory changes, by loading the blood with noxio stances, which may irritate the glands which excrete them, and by interfering with digestion, so that the contents of the int canal undergo changes which render them highly irritating.

We repeat that we recognize in cholera infantum the presence general alteration of nutrition, and the change in the entire blood as well as the local irritant action of the morbid contents of the tines. But it is in the highest degree interesting and significant importance of this last element in the causation, that sympton gether indistinguishable from those of cholera collapse, may be pr by agencies acting directly and solely upon the coats of the stomach and intestines.

Attention has been lately directed to these analogous conditions by Sedgwick, in a highly valuable article, "*On some Analogies of Cholera, in which suppression of urine is not accompanied by symptoms of uræmic poisoning*" (*Med.-Chir. Trans.*, vol. li, p. 1, 1868), in which he has collected many such examples. Among the causes which are clearly established as capable of producing such an analogous condition, are poisonous doses of corrosive sublimate, arsenic, some of the mineral acids, especially nitric acid; and also of certain drastic purgatives, especially croton oil. In these cases the peculiar symptoms produced, which are uniformly described by accurate observers as most closely analogous to those of cholera collapse, are due exclusively to the direct irritant action of the substance upon the gastro-intestinal mucous membrane.

The same effects have frequently been observed to follow the eating or drinking of poisonous animal matters, such as tainted or simply unwholesome meat or fish, and milk which has undergone some injurious, but as yet unknown change, decomposing vegetables, and some of the poisonous fungi. In this last group of cases, the local irritant action of the substances swallowed, must certainly be regarded as the principal cause in the production of the symptoms, although it is quite possible that the ingestion of such putrid animal or vegetable substances should also cause an altered condition of the blood.

In like manner, there are numerous morbid conditions of the intestines, or their peritoneal covering (as perforation with subsequent peritonitis, peritonitis from extension of inflammation, intestinal obstruction), which may be attended with symptoms closely analogous to those of cholera collapse.

We will also quote from Rilliet and Barthez, the following passage in regard to the remarkable memoirs upon *Inanition*, by Dr. Chossat, of Geneva, which show the analogy which exists between the results of experimental inanition and the chief symptoms of cholera infantum. "This is seen especially (1.) In the diminution of temperature, which conjoined with the loss of weight, is in inanition, as in cholera infantum: one of the principal causes of death. (2.) In the stupor which follows the jactitation as the temperature falls. (3.) In the colliquative diarrhœa during the last few days of life, the severity of which is proportioned to the rapidity of the fatal termination, and to the increase of the algidity."

It is not within the scope of the present work to discuss, critically, the various theories which have been advanced to explain the *modus operandi* of such causes in producing a state of collapse analogous to that of cholera, as well as the pathology of true cholera collapse.

It is, however, evident, that the mere drain of fluid from the alimentary canal, although it undoubtedly has much influence upon the course of the disease, cannot be regarded as the efficient cause of collapse, since in many cases profound collapse occurs with comparatively scanty discharges.

So too we must regard Dr. Johnson's hypothesis (*Medico-Chir. Trans.*, vol. li, 1867, p. 103, *et seq.*), that the symptoms of collapse are due to a spasm of the minute branches of the pulmonary artery, caused by the specific alteration of the blood in cholera, as based upon insufficient arguments. Thus, in the first place, we have cited instances above where symptoms altogether similar to those of cholera collapse, are produced under circumstances in which it is impossible even to suspect the existence of a poisoned state of the blood. Again, there is neither any clinical nor anatomical evidence to show that the contraction of the pulmonary artery is relatively greater than that of the rest of the arterial system; or again, that such contraction precedes the other signs of collapse.

In the last edition of this work, we quoted the opinion of Rilliet and Barthez in regard to the implication of the sympathetic nervous system in cholera infantum, and since that time we have been led to regard this more and more strongly as the essential cause of the collapse which characterizes this and other choleraic conditions.

The passage extracted from the admirable work of Rilliet and Barthez was as follows: "The disease we have just described is, in our opinion, a catarrh which has localized itself upon the digestive tube and the great sympathetic nerve. It is, of all forms of the catarrhal affection, that which most clearly justifies the idea of a poisoning. It proves also that anatomical differences alone will not suffice to establish a separation between the various species of the disease.

"Its catarrhal nature is demonstrated by the causes, which are those of all catarrhs (improper alimentation, epidemic influence, &c.); by the analogy of the symptoms; by the gradual passage of the mild into the grave forms, through intermediate cases; and lastly, by the fact that simple intestinal catarrh is often but the prodrome of choleriform enteritis.

"Reasoning from the simple fact that the disease is catarrhal, we admit the existence of a modification of the whole economy, and of some alteration of the blood.

"A study of the anatomico-pathological descriptions of the disease, and especially the observation of cases, demonstrates that the gastro-intestinal tube of children dying of this affection may be found in four different conditions:

"*a.* Either the stomach is softened without any lesion of the digestive tube.

"*b.* Or the stomach is softened, at the same time that the mucous membrane of the intestines, and especially its follicular apparatus, is diseased.

"*c.* Or the stomach is healthy, whilst the follicular apparatus or the mucous membrane are diseased.

"*d.* Or, lastly, the gastro-intestinal tube fails to exhibit any lesions appreciable by our senses in the present state of our knowledge, or it presents alterations too insignificant to explain the gravity of the symptoms."

t the same as in simple catarrh. On all these points we are
lled to remain in doubt; we content ourselves with stating the

e functional derangements of the trisplanchnic nerve play an tant part in the disease; under this point of view it differs from ld form, in which the innervation is normal, and from the cere- rm, in which it is especially the cerebro-spinal apparatus that is thetically affected. The proof of a disturbance of the ganglionic s system, rests upon the following physiological and nosological erations:

e disease exists at the age and in the physiological condition tion), in which functional derangements of the nervous system t lesions of organs are most frequent; it is often complicated hose very disorders of the general innervation, as is proved by profound changes in the functions of nutrition, circulation, and ication, which the amount of material waste will not always t for. We occasionally observe the same symptoms of nervous tion, and particularly the extreme smallness of the pulse, and gid phenomena, to arise in certain of the most violent attacks of neous peritonitis. Now these phenomena, which cannot always erred to the intensity of the pain, and which do not exist in in- ations of the other serous membranes, no matter what the rap- f their course, are only to be explained by the fact that the dis- eated in the abdomen, envelops the ganglia of the great sympa- nerve."

e the date at which this was written, our knowledge of the func- f the sympathetic nerve, especially with regard to its power of ting the calibre of the arteries, by inducing contraction or allow- laxation of their muscular coat, has been much advanced; and fully prepared to understand how the symptoms of cholera col- might be explained upon the supposition of a widespread power-ity so great that we have known it to cause vomiting in those d to it, and so adhesive as to render it necessary to change at ll the clothing and bed-linen of the child, and even then the fetor ling to the body of the patient, after repeated washings. This ve have seldom met with except in the choleraic form of summer œa. The number of the stools varies greatly. We have known ny as twelve to be passed in as many hours. In other cases they t so frequent, but the quantity at each time may be so great as to the body of its fluids at a more rapid rate than many more evacua- of an ordinary size. Eight, twelve, fifteen, or more than twenty in twenty-four hours are not rare. In one fatal case, in a child be- one and two years old, there were between twenty-five and thirty during the second night of the attack, in a space of twelve hours. ultaneously with, or soon after the diarrhœa sets in, there is ing. The matters vomited consist at first of the ordinary con- of the stomach, food, and water. Soon these matters consist of ater or medicines that may be taken, and of a serous or sero- s fluid mixed with small portions of bilious matter. Sometimes re tinted green as so often happens in the gastro-intestinal affec- of children. The vomiting may or may not be very frequent. imes it is one of the severest elements of the disease, causing thing taken to be rejected almost as soon as swallowed, or assum- e form of repeated and exhausting retching, even when the stom- quite empty. In connection with these symptoms there is rapid strength. The child is listless and still between the evacuations omiting, or tosses and moans with the jactitation of severe illness. ppetite is lost, but thirst is extreme, and constitutes one of the d phenomena of the disease. Water and ice are seized upon with reatest avidity, and taken almost incessantly, if allowed, though ed only a few moments afterwards.

abdomen is flaccid or retracted, not tender to the touch usu- nd the walls inelastic, so that they can be readily pinched up olds. The tongue, moist at first, with a thin white fur upon it, es pasty or dryish after a time, and is sometimes protruded from o time between the lips.

pulse runs up from the first, rising soon to 130, 140, and 150, and usually small in volume, whilst the temperature remains for a normal, rises slightly above the natural point, or, in some few the skin becomes hot. The urine diminishes in all these cases, n very severe ones, ceases to flow, or flows only in the smallest ities. As in true cholera, the degree of suppression of this func- s in proportion to the severity of the choleraic discharges. The ation, natural at first, soon becomes, if the case goes on unfavor- irregular, unequal, and anxious. The temper is irritable at the ning, the child being restless, peevish, disposed to fret and cry at ast contradiction or disturbance. The sleep is restless and dis- d, especially at night. The child wakes frequently, and almost s with crying. When asleep, the eyes are often but half closed,

and the brow contracted and frowning. The countenance soon
anxious and distressed. In sudden and severe attacks, it is
and subdued, pale and contracted.

If the disease is not soon checked, signs of collapse make t
pearance, and become more and more marked features. Th
becomes cool and then cold, the pulse grows smaller, thready, a
rapid; the features are drawn; the nose is sharp and thin; t
shrink within the orbits; the cheeks become sunken; the
passes into a still, quiet, and drowsy state; the vomiting ma
but the diarrhœa usually persists; the child falls into a coma
semi-comatose state, and death occurs quietly in this condition,
be preceded by slight convulsive movements. According to
searches of Roger (*op. cit.*, p. 399), the reduction in the temper
the axilla never approaches, in these cases of sporadic chole
which is found in cases of the true epidemic form occurring in c
Some very violent cases run their course in a day, a day and a
two or three days. We, ourselves, do not recollect to have se
case terminate sooner than in three days and a half.

In favorable cases, after one, two, or three days, the diarrhœ
to be so violent; the stools grow less frequent, smaller in q
thicker in consistence, containing a better concocted fecal mat
regaining a more natural odor. The vomiting and thirst gr
subside; food is again taken and retained; the circulation fa
the child, though weak and thin, and the subject for some da
simple diarrhœa, may regain its health in great measure, at th
a week or ten days. More frequently, however, the disease
the form of a more obstinate simple or inflammatory diarrhœa
may last for several weeks, to take on again, perhaps, from
rence of the exciting causes, the choleraic form, or to persist i
the former shapes until the return of cool weather.

Such is a picture of the disorder to which we think the
cholera infantum ought to be restricted. If physicians could
limit the title to this true choleraic disease, our mortality return
soon show the comparative frequency of death from this disord
from those more tedious and chronic diseases which have alrea
treated of under the designation of simple and inflammatory di
or entero-colitis.

The *duration* of cholera infantum, as we restrict the term, is
more than two, three, or four days. It may prove fatal in
shorter time. Dr. Eberle (*Dis. of Children*, p. 285) says it so
runs on to a fatal termination in five or six hours. Dr. J. Lewi
(*op. cit.*, p. 392) reports a case in a child sixteen months old
ended fatally in less than one day; a second, at seven months,
sickness of about one day; and a third, at twenty months, in th
hours. We do not recollect, in our own experience, which h
chiefly in private practice, a shorter case than one of three d
a half. In favorable cases the diarrhœa usually persists, as
stated, for several days after the disappearance of the cholera

us countenance, shrivelled skin, sighing or irregular respiration, and feeble or extinguished pulse, diminished or suppressed urin- cretion; with, finally, the still and limp body, and drowsy or ose brain, all mark a disorder which is readily recognized after once seen, or which may be distinguished by any intelligent per- ho has never yet met with such a case, if only the progression of ymptoms be carefully inquired into, and correlated with the it condition.

GNOSIS.—Cholera infantum, as we restrict the use of the term, is, rse, always a dangerous disease. Collapse, which either threatens o are attacked by it, or actually supervenes to a greater or less e, is well known by all physicians to be one of the most formid- norbid conditions to which the body is liable. The degree of r in any individual case must depend chiefly upon the ability of hysician to arrest, and of the patient to resist, this state. The bility of the supervention of collapse depends very much upon the nic condition in which the child is placed, upon the age of the it, the stage of the process of dentition, the present state of health, nate vigor of the constitutional force, and also, we may say, upon eriod of the disease and the degree of wisdom with which medical s are applied. Children placed in favorable hygienic conditions country, or in the healthier parts of cities, in large and well-ven- d rooms, and who have been fed upon proper diet, and who have fore been attacked by the disease whilst in previous fair health, uch more apt to escape collapse, or to recover from it after it has its appearance in a more or less marked degree, than those who laced in conditions the opposite of those we have enumerated. age, recent weaning, improper artificial diet, and feeble vital rs from any cause, either inherent or acquired, are amongst the unfavorable prognostics. Still, we should never despair until the noment, since we have seen some most surprising recoveries from these symptoms, the abdomen is tense and tympanitic, the countenance pinched, the expression languid, the extremities cool, the pulse rapid and small, and the child irritable and restless, or, on the other hand, very still and subdued, the prognosis is exceedingly bad. If, after the symptoms just enumerated, drowsiness or stupor, and then coma, convulsions, rigidity, or paralysis make their appearance, there is scarcely a hope left.

The favorable symptoms in any case are, diminution of the fever; equal temperature of the whole surface; cessation of vomiting; decrease in the number of the stools, and a return to their natural color, consistence, and odor; quiet, tranquil sleep; return of appetite; and lastly, a restoration of the natural temper and gayety of the child.

Prophylactic Treatment.—The danger to which teething children are exposed from residence in this city during the hot months of the year, is now so well understood that most families who can afford it remove to the country during the warm season, and by this course very generally avoid the disease. It is undoubtedly the best plan that can be adopted, and very commonly succeeds. When this cannot be done, however, the prophylactic treatment consists in a most careful attention to diet, dress, and exposure to the open air. If possible, the child should be kept at the breast until it has passed through its second summer, as there is but little danger from the disease after that period. If the weaning must take place prior to that age, it ought to be accomplished before the hot weather begins, as a change from the breast to artificial food during the warm season is very apt to bring on the disease. If the child is weaned, the diet must be strictly attended to. Up to the age of ten months or a year, the food should consist almost wholly of milk containing arrowroot, rice, oatmeal, or some farinaceous substance in small quantity. A little plain chicken or mutton water, with rice boiled in it, or a piece of beef or chicken to suck, may be given occasionally, but all vegetables and fruits should be strictly forbidden. After the age of ten months, some light soup and small portions of mutton, chicken, or very tender beef, minced very fine, may be given every day in addition to the milk food, which must still form the major part of the child's nutriment. Fruit of all kinds, all vegetables except rice and potatoes, and the latter are doubtful, ought to be carefully avoided until after the hot season has passed entirely away, or until the child has its full set of teeth. We have found the food prepared with gelatin, in the manner described at page 338, to answer better than anything else for a large number of children to whom we have prescribed it.

The dress ought to be arranged according to the heat of the day. It is the fashion in this city to keep young children clothed all summer in thick flannel jackets, and petticoats, and woollen socks. This is certainly too much for the hot days which so frequently occur in Ju August, and early in September, and is often, we believe, very injurious. A light gauze flannel shirt is the only woollen garment that need be worn during the warm season. On hot days a child should have only

in the air by the nurse for several hours in the morning and
, either in the garden attached to the house, if there be one, at
t door, walking in shady streets or public squares, or, better
king short excursions into the neighboring country, taking
wever, to avoid the intense heat of the sun during the middle
ay.

elieve that with constant and wise attention to these points,
t, dress, exposure to the air, and exercise, much may be done
preventing the disease even in families obliged to remain in
during the summer.

ted in the account of the symptoms, the choleraic disease often
nes in children who have already been the subjects of simple or
atory diarrhœa. When, therefore, a child in the city has diar-
it do not yield readily to treatment, and especially if the stools
be thin and watery, with any marked tendency to exhaustion,
to be regarded as being threatened with cholera. In such an
he best prophylaxis in the world is instant removal to some
ntry locality or the seaside.

TMENT OF THE ATTACK.—Regarding this disease as a truly chol-
e, we shall follow, in the consideration of its treatment, the plan
by some of the more recent writers on Asiatic cholera; and
cordingly divide our discussion of this subject into the treat-
ppropriate for the three stages of *evacuation*, *collapse*, and *re-*

young child who is attacked with diarrhœa, whether simple
nmatory, in the summer season, ought to be regarded as liable
ra, and should be carefully watched to prevent the development
lisease. For the proper treatment of such conditions, the reader
ed to the article on those affections.

d a child, either previously well, or the subject of diarrhœa of some article of diet. If it be found that the child has certainly eaten some such food, green apples, currants, gooseberries, or articles of this kind, and that these have not come away in the discharges, it is right to give first a moderate purgative. We prefer castor oil or syrup of rhubarb, half a teaspoonful of the former, or a teaspoonful of the latter, with two drops of laudanum at the age of one year, or a teaspoonful of castor oil, or two of the syrup of rhubarb, with four drops of laudanum at two or three years of age. Two hours after this dose, if the stools continue frequent and watery, we use the chalk mixture, with tincture of krameria and laudanum or paregoric (a teaspoonful of the chalk mixture with ten to fifteen drops of the krameria, and one drop of laudanum, or five of paregoric) every two hours at the age of one year. Thirty drops of the syrup of nutgalls (see article on entero-colitis), with an opiate every two hours, is often very useful. We believe that the great object is to arrest the watery discharges by stool. If the above means fail, laudanum may be given by injection, and two drops at one year, and double the dose at two years, every two or three hours, may be tried in addition to the above treatment. The quantity of opium must depend on its effects. Children, like adults, bear very different amounts. As soon as positive drowsiness appears, or the pupils become contracted much below their natural size, the doses must be suspended or diminished, or the intervals between them lengthened. Of course, if the stools lessen in frequency, quantity, or fluidity, the same reduction in the amount of the opium ought to be made.

When vomiting is severe and frequent, and the above remedies are rejected, we may use the one proposed in the article on inflammatory diarrhœa, consisting of solution of morphia, dilute sulphuric acid, and curaçoa cordial. This, or some similar remedy, is at times very successful. It is nineteen years since one of us saw a child nine months old, in deep collapse from a most violent attack of cholera infantum, who rejected its mother's milk as though it had been tartar emetic, whose stomach was only made worse by calomel, but who began to improve very soon upon doses consisting of two drops of aromatic sulphuric acid, and five drops of solution of morphia, in a teaspoonful of iced water, every hour. Since then we have frequently used the mixture above recommended in such cases, and we think, on the whole, with more control over the vomiting than anything else we have tried.

The experience gained by careful and lengthened observation in the treatment of the evacuation stage of Asiatic cholera, may well be applied to the affection under consideration, so much alike are they. Dr. Goodeve (*loc. cit.*, p. 177) gives first a full dose of opium (he says that calomel was generally combined with it in India, and though he does not "know that the calomel does good, it does no harm"), to an adult two grains, and half an hour afterwards he begins with an astringent in his own practice, usually the following mixture:

℞.—Plumbi Acetat., ...	gr. xxx.
Acid. Acet., ...	♏x.
Aq. Destillat., ...	f℥vj.—M. et ft. sol.

One ounce or half an ounce every half hour or hour.

ncy of the discharges is arrested, the doses should be given at
intervals, and when the peculiar serous character of the stools
isappeared, this remedy ought to be suspended, and some more
one substituted, in order to avoid the possibility of producing the
action of lead.

n spite of the treatment, the stage of *collapse* should set in, other
ds of treatment must be adopted. Here the stools are usually in
measure arrested, or they are few in number and small in amount.
bject to be sought after is to produce reaction, or rather to favor
forts of nature to bring about this change. It is now generally
wledged by men of large experience, that the old plan of pouring
ge doses of opium and alcohol is a great mistake. But little is
bed by the stomach whilst the body is in this condition, and not
uently the patient is injured, perhaps fatally, by the sudden ab-
on of these substances, when the stomach begins to act after reac-
as taken place. The opium may cause dangerous or fatal stupor,
y increase or keep up the tendency to suspension of the urinary
on, and thus promote one of the great dangers of the disease,
ic intoxication. The alcohol, if it has been used in large quanti-
vould also tend to clog the nervous centres, to cause gastric or
-intestinal catarrh, and to heighten beyond a safe point the febrile
ment which is so apt to accompany the reaction stage. Opium,
fore, should be avoided during collapse, or given only in the smallest
. Alcohol, though it should never be given in large doses, and
essly, as has so often been done, may be used in small quantities,
ially if it be found by close watching, that it promotes the force
olume of the pulse. Ten or fifteen drop doses of old and delicate
ly, in a teaspoonful or tablespoonful of ice-water, may be given
hour or two hours, at one year of age. During collapse the
ach is still often very irritable, and yet the thirst continues intense.
re glad to find that such men as Drs. Maclean and Goodeve recom-

tressing symptoms in cholera; there is incessant craving for co
doubtless instinctive, to correct the inspis ated condition of t
due to the so rapid escape of the *liquor sanguinis.* It was form
practice to withhold water—a practice as cruel as it is mis
Water in abundance, pure and cold, should be given to the pat
he should be encouraged to drink it, even should a large port
be rejected by the stomach; and when the purging has ceas
may with advantage be thrown into the bowel from time t
The use of water by enema, when the diarrhœa is checked, i
which ought not to be neglected, especially if the stomach
weak and irritable. A gill of tepid water may be used at a time
slowly and gently into the bowel, in the case of a child one or t
old. If this is retained well, the same quantity may be repeat
or two hours.

Whilst the collapse lasts, but little food can be taken. It i
retained if used in any quantity, and the stomach has lost,
measure, its digestive power. The only food we have found at
able has been thin chicken tea, Liebig's cold extract of beef,
wine-whey, given in two or three teaspoonful doses, every hal
hour. It is worse than useless to attempt more than this, as n
it not retained, but it evidently tends to keep up the nausea an
ing, and thus retard the natural effort at reaction. As to ren
this condition, we doubt whether anything better can be don
use water, as just advised, and small doses of brandy, and, if
be borne, small quantities of the liquor ammoniæ acetatis, ten t
drops, in cold water, every hour, at one year of age. There is,
a remedy which has obtained a great reputation amongst the
army surgeons in India, for the promotion of reaction in the
stage of epidemic cholera, which we have used ourselves with a
in adults, but not in children, though we propose trying it

are necessarily to pass through the collapse stage in all its terrors.
e contrary, many, when judiciously treated early in the disorder,
e collapse altogether, and yet they have had none the less the true
raic disease. Others suffer more profuse and exhausting losses of
by the discharges, or their vital power of resisting disease is less,
hey pass into more or less deep collapse; or hang, as we have seen
on the very edge of that condition, for one or two days, and then
ge from the danger, without having done more than cause the ex-
ieed physician the grave anxiety which such suspense must and
to create. During these doubtful moments of the attack, the
should be kept as quiet and still as possible. He should be made
in a constantly horizontal position, on a smooth and easy mattress,
crib, or on a large and roomy bed, and as little as may be on the
hich is uneven and unsteady, and which must give his weak and
isted muscles more work to do than they would have on the more
and even bed. If, however, the nature of the child be such that
ngs to the mother's or nurse's lap as his only safety, or if he have
taught (a most ill-judged lesson) to prefer the lap to any other
on, we must yield to him, rather than cause fretting or unhappi-
when his very life may hang upon the avoidance of all disturbing
nces. In this case, it is well to place him upon as firm a pillow
n be found, and let him be held on this in the lap. It is important
ove him, when this becomes necessary, as slowly and gently as
ble, always keeping the body on a horizontal plane, to avoid the
ncy to the syncopal state, which sudden movements, and especially
tting or erect position, are apt to produce. When the tendency
oling of the body shows itself, and this is usually first noticeable
e hands and feet, ears and nose, he should be kept wrapped in
, dry, and soft flannels or blankets. Flannels heated at the fire,
supplying dry artificial heat, are of great use here. Bottles or tins
with hot water, ought to be placed at the feet, under the blanket.

useful during the early stage, especially when fever was prese
have not found useful in these cases. The fatigue and irritation
by the disturbance of undressing and dressing the child, have s
to us to do more harm than any good derived from the heat
water compensated for.

When the case takes a favorable turn, and the *reaction stage* b
it is usually best to do nothing more than supply food and water
fully, and keep the body quiet and tranquil. The food may b
tiously and slowly increased in quantity, if the stomach has b
settled. Tablespoonfuls of thin chicken tea, just flavored with s
of Liebig's cold extract of beef, or of light beef tea, or of a mixt
wine-whey with two or three parts of thin arrowroot decoction (
spoonful to a pint), may be given every half hour or hour. If the
retained several times, and the child shows some little anxiety for
the same materials may be given in wineglassful quantities. A
same time, water and ice ought to be allowed from time to time,
thirst may call for them. On the second or third day of the rea
we may give, if the child shows a desire for it, a little milk and
and lime-water, one part of milk to one or two of water, with
lime-water, commencing with not more than two or three ounces
mixture at each feeding. The milk ought certainly to be very
diluted for the first three or four days after it is allowed. Wh
child has been carried thus far safely, we may gradually return
former habits of feeding, allowing meat to suck, a little bread, a
on, if it is old enough for such habits.

As to drugs during the reaction stage, they are not necess
everything goes on well. If, however, the fever run high, we
use small doses of the spirit of nitrous ether, as ten drops, in iced
every two hours at one year, or twenty drops of the solution of a
of ammonia, in the same manner, at the same age. If, as ofte
pens, the urinary secretion remains scanty, water, in such qua
as the stomach takes willingly, makes probably the best diuret
we may use the spirit of nitrous ether, as just recommended,
grain of acetate of potash and half a drop to a drop of tincture o
talis, every two hours, for a day or two.

When reaction is thus successfully brought about, the child
either improve rapidly and regain its previous health, or simple
flammatory diarrhœa may set in, and pursue the usual course of
disorders. In the latter event, the child, if the attack of cholera
occurred in the city, ought certainly to be removed to the coun
possible, since it is only too apt to have a recurrence of the ch
disease if kept in town, or to suffer, at least, a tedious and more
dangerous attack of the simpler form of diarrhœa. For the
treatment of either of these sequences to cholera, the reader is re
to the articles on those diseases, with the warning, however, th
such patients ought to be treated with every minute care as to hy
and therapeutic measures that experience and art have taught us
the health has been so rudely shaken by the sickness already en

inflammatory condition, which often attends upon the near ap-
h of teeth to the surface of the gum, may become an exciting
of acute digestive diseases, such as cholera. We think it is al-
well, therefore, to examine into the state of the mouth in a chol-
child as in other infantile disorders; and if the teeth are felt dis-
y through the gums, and the gums be found swollen, tense, hot,
ighly vascular, to cut them freely once. If, on the contrary, the
are firm, not hot, not redder than usual, and the edges of the
cannot be felt, it is foolish meddlesomeness to cut them.

hs.—In the early stage of cholera, before collapse has begun, and
the child is still reasonably strong, and particularly when there
rked febrile heat and dryness of the body, we think that the use
warm or hot bath, or of sponging with hot water and spirit, are
ent measures. The bath may be used twice, or even three times
if the child does not resist and scream. The temperature should
to 98°, and the child may be kept in the water from five to ten
es. It is an excellent plan to wrap the child, directly on lifting
m the bath, in a heated muslin sheet, and to apply over this a
et, and keep it thus enveloped on the lap for half an hour or
if it is comfortable and disposed to rest. If the child be some-
weak, whisky, added to the water, renders the bath more useful
afe. When the use of a bath alarms or annoys so as to cause
t agitation, it is best to substitute sponging with hot water and
y or vinegar, under a light blanket, two or three times a day.

iphlogistics.—It may appear to many, in these modern times, a
waste of words for us to state that we are opposed to bloodletting,
y form or at any stage of cholera infantum. But if any such will
he trouble to look over the works of writers of ten and twenty
back, he will find reason to think that if this be our opinion, it
to be expressed. When one of ourselves began to practise, in

the digestive mucous membrane; and that such doses of a reme
knowledged to be a powerful sedative, could not be proper in a d
which constantly tended towards exhaustion and collapse. It wa
stated that the small doses which we did recommend had been de
by some critics to be entirely too small, and that to this we coul
reply that the larger and more careful, and, we hoped, the wise
observation had been in the last few years, the more thoroughl
vinced were we that the larger doses, such as were formerly r
mended and used by nearly all writers and practitioners, were no
unnecessarily large, but most seriously objectionable. We went
say that the indiscriminate use of this remedy, in nearly all ca
the gastro-intestinal diseases of childhood became with some, w
lieved, a mere routine habit—that they never tried what mig
accomplished without it, but went on pushing the drug in co
doses, when the case, if trusted to simpler means, or even left
efforts of nature, would often do much better, we had learned to b
than when these delicate organs were made the receptacle of
that could not but tend to keep up the nausea, and vomiting, an
rhœa, which form so important a part of the morbid phenomena.
experience we have had since that time has but confirmed us in
opinions. Indeed we have so often been disappointed in obtaini
good effects from this drug, and have so often had reason to thin
instead of allaying nausea and vomiting, it increased them, and
to the exhaustion which is one of the dangers always to be con
against, that we have virtually abandoned it.

ARTICLE IV.

DYSENTERY.

It seems to us unnecessary to make more than a few rema
dysentery, since we have already spoken of the morbid conditi
the large intestine, in our article on entero-colitis. Dysentery
ever, differs from this latter affection by the fact that it freq
occurs in an epidemic form, and that there is a tendency to more
and extensive ulceration of the mucous membrane of the rectu
colon. It is an acute febrile disease, characterized by frequent e
tions, attended with more or less severe pain and straining, an
sisting of muco-sanguinolent or sanguineous substances, which a
to ulcerative inflammation of the rectum and colon.

The *causes* of dysentery are but little understood, beyond th
facts that it occurs as an endemic in some regions of country,
an epidemic over large districts. It is frequent, also, as a spora
ease, and in this form seems to depend upon the same causes a
already cited as productive of entero-colitis. Like cholera inf

measles and variola. We have often known dysenteric stools to
n the course of cholera infantum, and in a considerable number
s such as we have described under the title of entero-colitis.

anatomical lesions are confined chiefly to the large intestine, and
e same as those described under the head of entero-colitis, ex-
hat they are of a graver character. The mucous membrane is
nly found thickened, swelled, red, and softened; the submucous
sometimes presents ecchymosed points; the follicles are often
d, their orifices being enlarged and ulcerated, as described under
-colitis. In grave cases, particularly those occurring under an
ic influence, there are usually more or less extensive ulcera-
which may implicate only the mucous, or extend to the muscular
the peritoneal coat. In such instances, pseudo-membranous exu-
s are often formed, sometimes in large quantity, and often cov-
he ulcerations. The intestine contains sanguinolent mucus, or
s a brownish or greenish material, which is evidently the result
angrenous condition of the mucous membrane, pus, and lastly
embranes. In some rare cases, perforation has been known to
ace.

PTOMS.—The symptoms are much the same as those already de-
as existing in entero-colitis, excepting that the local symptoms
re severe, and the presence of blood in the stools constant. The
often begins as a *diarrhœa.* The *stools* at first contain feculent
als, but after a time become very thin, small in quantity, and
chiefly of mucus mixed with blood. The blood may be black
considerable quantity, or of a dark rosy red color, or like the
gs of flesh; it is mixed with greenish or yellowish substances,
mucus, fragments of false membrane, or purulent fluid. In
children there is evidently *pain,* from the restlessness, moving
limbs, and crying about the time of the evacuations, while in
who are older, there is true *tenesmus,* like that observed in adults.

In mild cases there is usually no *fever*, or very little, while in sev attacks, there is high fever during the first few days, marked by quent pulse, hot dry skin, followed after a time, unless a favora change takes place, by coolness of the surface, contraction of the co tenance, hollow, sunken expression of the eye, rapid emaciation, death.

It is useless to give a longer detail of the symptoms, as they are same as those already described in the article on entero-colitis.

The *diagnosis* presents no difficulties. The frequency of the charges, the pain in the course of the colon and in the anus, the ten mus, the character of the evacuations, and the febrile reaction, all ma the disease easy of recognition.

The *prognosis* is favorable in mild cases, unattended with much fev or very frequent discharges. When, on the contrary, there is viol fever in the beginning, followed by disposition to coolness and collap when the stools are exceedingly frequent, and attended with sev pain and almost constant straining; and when they consist of noth but mucus, mixed with considerable quantities of blood, or with pu false membranes, the prognosis is very unfavorable. Of 36 cases, termination of which we have recorded, 4 proved fatal.

TREATMENT.—The treatment of dysentery in children is often unsatisfactory. The mere variety of the remedies recommended different writers and practitioners marks the uncertainty of the eff obtained from drugs. Mild cases so generally get well under any tr ment that all methods have had their supporters and advocates, w grave cases, and especially those occurring under the influence of sev epidemic visitations, are so difficult of treatment, and often so li under the evident control of medical means, as to leave the careful server in great doubt as to what he ought to set down as the evid result of his own interference in the case, and what as the results of efforts of nature to cure the disease.

Mild cases of the disease, in which the fever is not very high, number of stools not great, and the pain and distress moderate, req little else than *rest* in bed, a light and unirritating *diet*, and the us *opium* in small quantities either internally or by injection. When t is reason to suspect the presence of unwholesome food in the stom or of unhealthy secretions in the intestines, it is necessary to giv the beginning small doses of some mild *carthartic*. The one gener preferred is castor oil, which may be given either simple, in the do a small teaspoonful containing one to four drops of laudanum accor to the age, or in the form of emulsion. The latter is the mode of ploying it usually chosen. A drachm of oil should be rubbed up a scruple of gum, a little sugar, from two to eight drops of lauda according to the age of the child, and seven drachms of some arom water. The dose is a teaspoonful every three or four hours. If case continue to improve under the emulsion, it may be continued couple of days, but should the stools become more and more freq and the pain and tenesmus increase, it must be suspended after on *liet* in these cases should consist of arrowroot, sago, tapioca, or ıch food, made into thin pap with milk and water; and the quanowed ought to be very moderate. Rest in bed, in the cradle, or ap, is very important. The child ought not to be allowed to run or use exertion of any kind.

re the pain is severe and the fever high, and where there is a leal of soreness in the abdomen, *depletion* may with propriety be d to, but always with moderation and prudence. A few leeches l around the margin of the anus, or to the surface of the abdoften prove of great service in relieving pain and tenesmus. An onal *warm bath* is very soothing and useful.

ery severe cases of dysentery the treatment is, as above stated, t and uncertain, owing to the dangerous character of the disease, the fact that so many different methods have been recommended erent writers.

he early stage of a severe case, whilst the febrile reaction is high e strength of the patient still unsubdued, depletion by leeches in children and by venesection in older ones, is strongly approved nany able practitioners. For our own part we have not resorted s a general rule, from the fact that we have so often found the th of the child to fail rapidly under the disease itself. In a few of ses, however, leeching around the anus has been followed by manienefit. The remedies most commonly depended upon are castor emulsion with laudanum, mercury, sugar of lead, opium, nitrate er, spirit of turpentine, and astringents. The castor oil emulsion, ed as mentioned above, is useful in the early part of the attack, ases to be so, according to our experience, after the first twentyr forty-eight hours. From mercury we have not ourselves ob- any very positive benefit, though, in combination with opium pecacuanha in small doses, it is much thought of by many excel-

as administered, the opium should be given either by the mouth, in
form of laudanum or solution of morphia, or in that of Dover's pow
or in the form of suppository. We should indeed strongly recomm
the administration of opium in this latter form in such cases, since
unquestionably obtain a certain beneficial local action, in addition t
constitutional effect through its absorption. The amount of op
should be about the one-eighth of a grain at two years of age, w
should be incorporated with butter of cocoa, a most bland and soot
substance, which dissolves readily at the temperature of the body. W
made of this substance, and of proper shape and sufficiently small,
suppository can be introduced without pain, and will usually be
tained. They should of course be repeated at intervals, depend
upon the effect produced. Opium is almost always employed in
nection with some other remedy, and particularly with calomel or
tate of lead. The dose of calomel is from a sixth to half a grain, or
used by some practitioners, a grain, with a twelfth of a grain of opi
or half a grain or a grain of Dover's powder, every three or four ho
for children two or three years of age. The acetate of lead is
relied upon, and has probably higher testimony in its favor than
mel. We have ourselves obtained excellent effects from it in som
stances. The dose is from half a grain to a grain every two or t
hours at two and three years of age.

There are two other remedies not yet mentioned, which have
of more positive efficacy in our own practice than any others, with
exception of opium. These are the nitrate of silver and the solu
of the nitrate of iron. The former we have used both internally
by injection, the latter only by injection. For an account of the m
in which these remedies are employed by different authorities,
reader is referred to the remarks on chronic entero-colitis. We
employed nitrate of silver in 14 cases of dysentery. These were
severe attacks, and some of them most violent. Of the 14 cases, t
died. The remedy was given by the mouth alone in 7 cases, by in
tion alone in 5, and by the mouth and by injection both in 2. It
proved most beneficial in its effects, in our hands, when given by
mouth, though its influence over the disease has always been less
mediate than when used by injection, but it has been more perman
The dose in which we have used it has varied with the age of the c
and with the severity of the symptoms. For children two years
we have usually employed from one grain to one and a half grains,
for those of five or six years or upwards, two grains dissolved in
ounces of a vehicle, consisting of an ounce each of syrup of gum ar
and distilled water. The dose is a teaspoonful every two or t
hours. It is well, as a general rule, to add from four to sixteen d
of laudanum, according to the age of the subject, to the mixture.
use by injection we have commonly employed for each enema two gr
for young children, and four grains for older ones, dissolved in
ounces of distilled water. The injections are to be repeated twic
three times a day. After the nitrate of silver enema has come a

it is a good plan to throw into the bowel a laudanum and starch injection.

We have made use of the solution of nitrate of iron, to which allusion was made above, only as an injection in acute dysentery. We have employed it in eight cases, and are quite sure that it was of essential service in six, while in two it appeared to irritate, probably because the quantity given was too large. Our mode of applying it is to mix from ten to twelve drops in four ounces of tepid water for each injection. The injections were given twice or three times a day, and they were followed, as soon as they had returned, by a laudanum injection. On two occasions, the nitrate of iron injection remained in the bowel for several hours before being rejected, and thus restrained for that time the stools, which had previously been very frequent, and attended with much tenesmus.

When the stools continue very frequent in spite of the use of opium in some of its many shapes, when sugar of lead and nitrate of silver have been employed without controlling the frequency of the discharges, we have sometimes found the mixture of aromatic sulphuric acid, laudanum, and syrup of rhatany, before recommended, very beneficial. When the stools, in addition to their dysenteric characters, have been watery, and greenish in color, the chalk mixture, with laudanum and tincture of rhatany, kino, or catechu, repeated every two hours, with occasional laudanum enemata, has been very useful.

The *hygienic management* of dysentery should be precisely the same as that which was suggested as proper for entero-colitis.

ARTICLE V.

DISEASES OF THE CŒCUM AND APPENDIX CŒCI—TYPHLITIS AND PERITYPHLITIS.

SYNONYMS; DEFINITION.—The diseases of the cœcum and of its vermiform appendix are so important and frequent, and present so many peculiarities, as to demand a separate and detailed consideration. In approaching their discussion, it is necessary to bear in mind several important points in which the cœcum differs from the rest of the large intestine. Thus its peritoneal investment is deficient over the posterior part, which is generally quite firmly attached to the right iliac fossa by connective tissue, containing a small proportion of fat. Its anatomical relations moreover indicate that the semi-feculent materials passing from the ileum are destined to be retained in the cœcum to undergo some important action. The ileum at its lower portion rarely has a calibre greater than one-third that of the cœcum, a circumstance which must materially retard the progress of the contents of the latter, and a further detention is caused by the ileo-cœcal valve, which prevents all re and by the position of the cœcum, which compels it to force onward contents in opposition to gravity. The view that the cœcum is seat of an important part of the digestive process, either in the ap priation of any remaining nutritious elements of the semi-fecul chyme, the absorption of its watery parts, or the elimination of so excrementitious matter from the system, receives confirmation fr the very rich vascular and glandular supply of the walls of this par the intestine.

In addition to this, the cœcum has opening into it, usually at its lo and back part, the appendix vermiformis, a narrow, elongated, gl ular process, varying from three to six inches in length, and havin average diameter about equal to that of a goose-quill, although calibre is quite small. It is usually directed upwards and inwards hind the cœcum, and lies coiled upon itself. Its function appears t the secretion of a viscid ropy mucus.

We thus see in the anatomical and physiological relations of cœcum strong predisposing causes of many morbid conditions. Am these the most frequent are distension and impaction of its calibr hardened fæces; the lodgment of a foreign body or intestinal con tion in one of its pouches or in the appendix, an accident which o excites violent and destructive inflammatory action; and finally l ized inflammation of one or all of the coats of the cœcum or the miform appendix.

This last condition has received the names of typhlo-enteritis, f τυφλος, blind, and εντερον, intestine; typhlitis; and cœcitis, from Latin word *cœcum*, also signifying blind.

The pericœcal connective tissue is also occasionally the seat o flammatory action, constituting a condition known as perityphlitis

SEAT AND CHARACTER.—Clinical experience and the researche pathological anatomy fully justify us in recognizing the above-m tioned morbid conditions, but the question as to their relative freque and importance is still far from being settled.

By some authorities the diseases of the cœcum are regarded as ondary to morbid affections of the appendix, the latter consisting erally in the presence of foreign bodies, or of hardened, inspiss mucus, which act as the focus and exciting cause of the inflamma of the cœcum.

It is probable, however, in regard to the simple form of typh that both the cœcum and its appendix are subject to a peculiar local inflammation, involving all their coats, and due to the temporary a of some foreign substance or intestinal concretion in their cavity, the action of the causes to be hereafter considered. It is indeed sible that the inflammation excited by the presence of a foreign may subside, whilst the cause still remains arrested in the appendi one of the pouches of the cœcum; but experience would lead u infer, that, when once inflammatory action has been excited, so lo the foreign substance which has caused it remains in contact wit

membrane, the tendency is usually to produce ulceration and
on of the coats of the bowel.

d this same discrepancy of opinion in regard to those cases
l with perforation of some portion of the cœcum, and the forma-
an abscess in the iliac region. Dupuytren, who was the first
attention to the pathology of these *iliac abscesses*, attributed
suppurative inflammation of the pericœcal connective tissue,
d in many cases by extension of inflammation from the coats
cœcum, and held that the perforation of the bowel often found
ection, was a secondary phenomenon, and was in fact the *mode*
ch the abscess was discharged. Inflammation and suppuration
pericœcal tissue does indeed occur as an idiopathic affection, or
xtension of inflammation from the cœcum, but it is of extremely
ccurrence; and there can be no doubt that nearly all cases of
scess are due to perforative ulceration of either the cœcum or
lix. As Bouchut suggests, one proof that most cases of non-
ral iliac abscess are thus due to perforation of the cœcum or
lix, is afforded by their almost constant occurrence upon the
ide. Thus of 57 non-puerperal iliac abscesses collected by Gris-
only were on the left side; while of 26 puerperal ones, 15 were
t side.

necessary, however, to carry this question one step further, and
ermine, if possible, the relative frequency of perforation of the
and of the appendix. It has been supposed, as by Ferrall, that
ion of the cœcum is in most cases the starting-point in the de-
ent of the lesions. But, while we are in possession of a suffi-
umber of recorded cases, 12 of which we have collected, where
ortem examination has proved the abscess to have originated in
ation of the cœcum, there is good reason to believe that perfora-
f the intestine is much more frequently found associated with
e of the appendix than with ulceration of the cœcum itself.

SES.—In addition to the anatomical peculiarities of the cœcum
pendix, which must be regarded as predisposing causes of these
ons, there are other conditions which exert an unquestionable
ce.

strumous diathesis has been regarded as a predisposing cause of
es of the cœcum and appendix. It does not appear, however,
flammation of these parts is more frequent in strumous subjects,
erely that it has a greater tendency in such patients to run on to
tion and perforation of the bowel.

—The greater irritability and proneness to inflammation which
testinal canal presents in early life, appears to have its effect
the development of typhlitis, since a considerable majority of
ed cases have occurred under the age of 25 years. This is par-
ly true of the milder attacks, which are not attended with ulcer-
Thus, of 38 cases of typhlitis at all ages, which recovered with-
rforation of the bowel, 29 occurred at or under the age of 25; 9
ere in older persons. Of these 38, 13 occurred in our own prac-

tice, and were aged as follows: 2 under six years; 6 between 6 and 12 years; 5 between 12 and 15 years. Finally, 19 of the 38 cases occurred at or under the age of 15 years. This does not appear to hold true, however, with regard to perforative ulceration of the cœcum and appendix.

We have not met with any case of perforation of the cœcum occurring during childhood, but of 25 cases collected from different sources, 13 occurred after the age of 25: 12 at or under that age. Of these 25 cases, 12 only were verified by post-mortem examination, of which 5 were under 15 years of age, 2 between 15 and 25 years, and 5 above 25 years.

Of perforation of the appendix vermiformis, we have met with 3 cases in children, aged respectively 4½, 8, and 11 years. Of 25 other cases, collected from various sources, in which the age is stated, 9 were above, 16 below 30 years of age. Of these 16, 3 only were under 15 years of age, so that, including our own 3 cases, we find 6 cases occurring under 15 years, 13 between 15 and 30, and 9 above 30 years of age.

Sex.—The influence of sex has been very variously stated by different observers. It appears, however, that males are somewhat more prone to all these forms of disease than females. Thus of 39 cases of typhlitis, which recovered without perforation of the bowel, 23 were in males; 16 only in females. Of 13 of these 39 cases, which we observed in children, 8 were males and 5 females.

Of 25 cases of perforation of the cœcum, 13 occurred in males; 12 in females.

The sex is stated in 27 of 32 cases of perforation of the appendix. Of these, 21 were males; 6 only were females. Of 6 cases occurring under 15 years of age, the sex is stated in 5, 4 of which were males.

Occupation.—Various occupations, especially those involving sedentary habits, have been supposed to predispose to these affections, as also the practice among females of wearing tight corsets. Experience, however, has not verified these suppositions.

Constipation.—A constipated state of the bowels undoubtedly predisposes to these affections by favoring the production of a distended and impacted condition of the cœcum, even if the presence of the hardened fecal matter does not prove the exciting cause of some cases of typhlitis. Rokitansky considers this cause so important that he has given the name typhlitis stercoralis to one form of inflammation of the cœcum.

EXCITING CAUSES.—*Cold and Exposure.*—The action of these ordinary exciting causes has been denied by some observers on account of the frequent absence of a chill or rigor at the inception of the attack, and the development of the local before the general symptoms. It cannot, however, be doubted that typhlitis may be idiopathic and arise from the ordinary exciting causes, though the cases are comparatively rare.

Food.—In several instances the attack appears to have been brought on by the use of indigestible or irritating articles of diet, among which

m Bodies and Intestinal Concretions.—This class, comprising very
substances, certainly forms the most important and frequent
diseases of the cœcum and appendix.
annot be positive as to the amount of influence they exert in
der and more tractable cases of simple typhlitis, though it is
obable that many of these are caused by the temporary arrest
foreign substance in the appendix, or one of the pouches of
um. Thus, in a case reported by Dr. Wynn Williams (*Lancet*,
25th, 1862), in a male adult, three months after a well-marked
tack of typhlitis, which yielded to judicious treatment, a large
al concretion, having a plum-stone for a nucleus, was passed by
um. They are, however, the efficient cause of a large majority
e cases of perforative ulceration of the cœcum and its appendix.
diseases of this latter part, however, are far more uniformly de-
t upon the presence of foreign bodies even than in case of the
; almost three-fourths of all recorded cases of perforation of the
ix having been due to this cause. In 6 cases occurring in chil-
ome extraneous substance was found in the appendix in each
2 a foreign body was present; and in each of the other 4, an in-
concretion.
of these bodies are true intestinal concretions, having for their
merely a nodule of hardened fæces or inspissated mucus. They
nsiderably in size, the majority of them being about the size of
y-stone or date-stone, though Habershon mentions having seen
large as a hen's-egg. They are also of very varying consistence,
ng to Volz, as quoted by Hanbury Smith, constituting three
es: the soft, resembling excrement in appearance and odor, and
a nucleus of hardened fecal matter; the semi-hard, of a grayish-
color, consisting of shining concrete layers, with a nucleus which
a foreign body; and the stony, which are of a grayish-white or

tioned grape-seeds, cherry-stones, date-stones, pins, bristles, fragm of glass, biliary calculi, and balls of worms, either ascarides or lun coids.

It may not be amiss to remark, here, that some intestinal con tions resemble, to a marked degree, the seeds or stones of diffe fruits, particularly of the cherry, date, and plum; and there is no d that many of the bodies found in the cœcum or the appendix, reported as cherry-stones or date-stones, have been in reality intesti concretions.

Whatever be the nature and origin of these bodies, it is probable t in many cases some morbid condition of the mucous membrane of cœcum or appendix precedes their formation or lodgment, and the velopment of the grave symptoms which often follow.

As Habershon justly remarks, the ordinary calibre of the appen is so extremely small and so thoroughly lubricated, that it must very rare for any extraneous substance to become impacted in it long as it remains healthy. A further argument in favor of this vi is the fact that the presence of these concretions is attended by most varying results, since very large and irritating bodies have b occasionally found occupying the cavity of the appendix with having produced any symptoms during life, or any inflammation of surface; while, on the other hand, minute concretions of semi-s consistence, and apparently unirritating in character, have frequen been observed to act as the foci of the most serious and destructive flammatory action.

ANATOMICAL APPEARANCES.—In the simple forms of typhlitis, mucous membrane of the cœcum presents the usual appearances of flammation; the peritoneal investment is also involved, and besi injection and opacity of this membrane, there are adhesions formed tween folds of the intestines.

When, however, ulceration is present, as often results from the pr ence of foreign bodies, or in strumous subjects, it is a matter of t utmost importance which portion of the cœcum is involved, since, such ulcers have a strong tendency to perforate the coats of the bow if they occur on the anterior part of the cœcum, which has a periton investment, there is the greatest danger of an escape of the contents the bowel into the peritoneal sac, and the development of rapidly fa peritonitis. Thus, of 10 fatal cases of perforation of the cœcum, which the seat of the perforation was determined by post-mortem amination, the anterior wall was involved in 6 instances. If, on other hand, the ulcer be seated on the posterior part of the cœcu where it is attached to the iliac fossa by connective tissue, and dev of a peritoneal covering, perforation is not directly followed by any s unfortunate results. Inflammation is excited in the pericœcal conn tive tissue, suppuration ensues, and the resulting abscess follows one several courses, precisely as in idiopathic suppuration of the perica tissue. Thus it may reopen into the bowel; may burrow along sheath of the psoas muscle, and point below Poupart's ligament; o

nse, the cœcum itself is contracted, its coats thickened, and the
membrane almost entirely destroyed, or converted into a reti-
d trabecular fibroid tissue. Rokitansky has found in such cases
um converted into a slate-colored capsule, with dense parietes,
ize of a walnut or a pigeon's egg.

ppendix vermiformis may be the seat of catarrhal inflammation,
ed with inflammation of its peritoneal covering. Death does
ult from this condition, but the pathological appearances are
y analogous to those found in all cases of localized sero-enteritis.
, however, the appendix has been the seat of ulceration, and
as resulted before perforation has occurred, its cavity is found
ed with pus, its mucous membrane deeply ulcerated, and in
every instance, a foreign body or an intestinal concretion is

lceration of the appendix varies in its position and extent, at
eing seated at the free extremity, at others occupying the lower
f the appendix, which is perhaps the more frequent seat. In
to its size, the ulcer and the subsequent perforation may be
ery small, or else may involve almost the entire circumference
ppendix.

r favorable circumstances, especially if the foreign body is dis-
, the ulceration ceases, and the appendix becomes converted
igamentous cord, its calibre being entirely obliterated.

n perforation of the appendix occurs, the results vary according
degree of local peritonitis which has been excited. If the ap-
has become strongly adherent at the point where perforation is
o take place, this accident may not be followed by the develop-
f general peritonitis. The points to which the appendix gener-
comes adherent, are the cœcum, the anterior abdominal wall,
e right iliac fossa. In the first case, the circumscribed abscess

Unfortunately, however, the adhesions are rarely strong enough to circumscribe the purulent matters escaping from the appendix, so that these generally find their way into the peritoneal cavity, and excite general peritonitis.

We subjoin the histories of 3 fatal cases of perforation of the appendix from intestinal concretions, occurring in children, in all of which some local peritonitis with adhesions had occurred, but had not sufficed to prevent the above unfortunate termination.

CASE 1. *Intestinal concretion in the appendix cœci, causing perforation and fatal peritonitis.*—T. D. S., a healthy, well-grown boy, 11 years of age, rose on the morning of December 25th, 1860, apparently quite well. Soon afterwards, however, he complained of pain in the right iliac and lumbar regions, was chilly, and returned to bed. A dose of castor oil was given him. In the course of the day fever came on.

Next day he was feverish, with a pulse of 132, a hot and dry skin, and a moderately furred tongue The pain still continued, with tenderness and slight distension of the abdomen on the right side; there was no vomiting. His bowels had been acted upon three times by the oil. Leeches and a poultice locally, and a mixture of blue pill with rhubarb syrup internally, were ordered.

On the 27th and 28th, the symptoms were much the same, except that the tenderness and distension increased. The pain was aggravated by coughing, by a full inspiration, and by motion, especially of the right leg. The bowels were slightly moved by the mixture; no vomiting as yet. His fever continued, but the pulse fell to 108, and his skin was somewhat cooler.

On the 29th he was worse. All his symptoms were aggravated, and vomiting set in; his bowels became confined. Small doses of calomel and opium were given, enemata of various kinds were tried, and rhubarb syrup with a little fluid extract of rhubarb was perseveringly employed, but without effect. The abdomen now became greatly distended, exceedingly sonorous, and painful; the stomach grew more and more irritable, rejecting from time to time, towards the last, with a sudden spasmodic effort, everything that was taken by the mouth. The bowels were completely obstructed, so that repeated injections of various kinds elicited no discharges, even of flatus. The urine continued to be secreted to the last; and there was at times, in spite of the nausea and vomiting, quite a strong desire for milk and bread.

During the last few days wine-whey and beef tea were given in small quantities; and opium by enema and by the mouth was used to allay pain. On the third day of the treatment a blister four inches square was applied over the seat of tenderness; but neither this nor any of the other remedies employed seemed to exert the least effect upon the course of the disease.

Death took place on the eighth day, January 1st, 1861.

The autopsy was made by Dr. Packard, twenty-four hours after death. Body large, muscular, and well formed; rigor mortis well pronounced. Abdomen only examined.

On making the usual section, several coils of small intestine, very greatly distended with gas, and markedly injected, with flakes of lymph here and there over the surface, at some points gluing the adjacent coils together, were seen concealing the rest of the abdominal viscera. After some search, the colon was found, very much contracted, except at the cœcum. The ileum was in like manner contracted, the narrowing beginning at about the end of the jejunum, which formed the distended coils above mentioned. No cause was assignable for the constriction at this point; but a little lymph was thrown out here, and it may have been that the bowel had been twisted.

The appendix vermiformis was bound down by peritoneal adhesions. Within it, near its origin, was a mass as large as a small bean, but perfectly oval. Just beyond this mass, at what seemed to have been its position, was an ulcer extending all round

tube, and of a gangrenous aspect. At the distal end of this ulcer was a perfora-
by which matter had found an exit into the peritoneal cavity. The rest of the
looked as if it had been distended by the pus before the opening was formed.
er its escape from the appendix, the matter seemed to have caused a circumscribed
itonitis, in addition to the general one already indicated. The adhesions bound-
this peritonitis had extended up to the liver, the convex surface of which was
lowed to a slight depth in an oval shape, the depression being lined by false mem-
ne. The whole quantity of the pus was perhaps f℥iv.

The liver was pale in patches, but was not degenerated. Rather too large a num-
of oil-drops existed in a dark, inflamed portion of its substance, just beneath the
pression above mentioned; but even here the quantity was not great. The mesen-
ic glands were swollen and injected over the surface. No other lesions were
erved.

Case 2. *Intestinal concretion in the appendix cæci, causing perforation and fatal peri-*
itis.—C. B., æt. 4½ years, was taken sick with slight fever, pain in the abdomen,
me vomiting, constipation, and inflation of the abdomen. With these symptoms
ere was marked tenderness in the right iliac fossa. After three days the bowels
re well opened, and the fever subsided; the abdomen, however, continued inflated,
d a small but distinct tumor had appeared just inside of the right anterior superior
inous process of the ilium.

He continued to improve, and was apparently much better, but was strictly con-
ned to bed, when on the ninth day at 3½ P.M., he was seized with severe abdominal
in; symptoms of collapse rapidly appeared, and he died at 2 A.M., the following
orning.

At the autopsy an intestinal concretion of the shape and size of a date-stone was
und in the appendix. The end of the appendix was perforated, and had become
tached to the anterior wall of the abdomen, where a small abscess had formed in
cellular tissue between the peritoneum and the abdominal muscles, evidently
king an outlet through the abdominal parietes. The wall of this had unfortu-
tely ruptured into the peritoneal sac, and death had resulted in a few hours from
neral peritonitis.

Case 3. R. P., a healthy girl, aged 7½ years, died at the end of the second week
a well-marked attack of perforative disease of the appendix vermiformis.

At the autopsy a large, rounded intestinal concretion was found in the appendix
ci, which was perforated, allowing an escape of matter into the peritoneal cavity.
here was marked general peritonitis, with the formation of a large quantity of pus.

Symptoms.—Mere *distension* of the cœcum by hardened fæces, without
ctual inflammation of its coats, may be attended with constipation,
ome vomiting, and the presence of a somewhat sensitive tumor in the
cal region. According to Copland, when the distension by accumu-
ated matters is great, it may, from rising high in the abdomen and
ressing upon the nerves, vessels, and ducts in its vicinity, occasion
umbness and œdema of the right lower extremity, retraction of the
ight testicle, and derangement of the urinary secretion, so as to be
istaken for disease of the kidney.

Inflammation of the mucous membrane only of the cœcum, is generally
ttended with a moderate degree of fever, slight pain and tenderness
n the right iliac fossa, and some diarrhœa, with mucous, offensive
tools. This condition is not unfrequently chronic, and evinces its pres-
nce by no very positive symptoms, unless adjacent parts have become
volved in the inflammation, or an acute attack of typhlitis supervenes.

Typhlitis, or inflammation of all the coats of the cœcum or appendix, usually appears suddenly during full health, or it may be ceded by slight intestinal derangement, such as diarrhœa or co pation.

Pain.—The earliest and most marked symptom is generally pai the region of the cœcum, which appears suddenly, becomes fixed constant, rarely remitting, and is greatly increased by a deep ins tion or by coughing.

This pain is attended from the very first with such exquisite ten ness on pressure in the right iliac region, that the weight of the clothes cannot be borne, and the patient shrinks from the lightest to To relieve this pain the patient lies toward the right side, with thighs flexed upon the pelvis, and any attempt to draw the right down causes agonizing suffering. These local symptoms are usu confined to the right iliac fossa, though the entire peritoneum may come somewhat involved, and the symptoms of general peritonitis velop themselves.

Fulness or Tumor.—Owing to the distended state of the bowel it and to the adhesions formed between folds of the intestines, or in s rare cases to an inflammatory effusion behind the cœcum in the fossa, there is marked fulness or even a well-defined tumor in the r iliac region. Frequently there will be merely fulness during the few days of an attack, and then a distinct tumor will be develo In 11 of 39 cases of acute typhlitis, recovering without perforatio the bowel, a distinct tumor was present. In most of the other c the conditions of the cœcal region is described as one of fulness or tension. Of these 39 cases, 19 occurred in children under 15 year age, in only 3 of which a distinct tumor is recorded to have been served.

Constipation.—The bowels are almost invariably constipated; in m cases very obstinately so. This constipation is frequently associ with quite severe tormina and tenesmus, and if the cœcum be m distended, there may be pain shooting down the right thigh, or nu ness and even œdema of this part, together with retraction of the r testicle.

It is important to observe here, that in most cases, when once constipation is relieved, and free feculent stools procured, the n threatening symptoms of the attack rapidly subside.

Vomiting nearly always attends in children; it was present in a our 13 cases. It is never stercoraceous, and indeed is rarely trou some unless the constipation is marked, or perturbating treatment been adopted in the beginning of the attack.

Fever.—The attack is not usually ushered in by any chill or ri but marked febrile symptoms soon appear, the pulse becomes acc ated, the skin hot, the tongue furred, and the thirst extreme. T symptoms usually subside under appropriate treatment after a vari time, generally from four to twelve days; the bowels are opened fr the pain and tenderness diminish, and the fulness in the right region gradually disappears.

his description of symptoms applies to acute inflammation both of cœcum and appendix, as there are no well-recognized differences he symptoms of these two conditions. The only probable points of erence are, that in inflammation of the appendix the pain is more te, and the thorough evacuation of the bowels is not followed by same prompt and complete relief.

Perforation of the Cœcum.—When, however, perforative ulceration progressing, the symptoms follow a different course. The constipan may be relieved and the vomiting cease, but the local symptoms rsist, until the rupture of the bowel leads either to speedily fatal ritonitis, or to the effusion of fecal matter mixed with the products inflammation into the pericœcal tissue. When this latter event ocrs, the constitutional symptoms soon indicate the occurrence of supration, and hectic irritation, with rigors or marked chills succeeded drenching sweats, colliquative diarrhœa, rapid prostration and emaation, with a dry brownish tongue and feeble running pulse, soon pear. Despite the desperate character of these symptoms, hower, recovery may take place if the abscess points externally in the ay already described, and does not open into the peritoneal cavity. is necessary to be aware that the approach of a fecal abscess to the rface is not attended with the appearances which usually accompany e pointing of an abscess. Thus, instead of the skin becoming tense, rominent, and reddish, with a distinct sense of fluctuation present, he surface becomes doughy and dark-colored, and upon palpation a istinct sense of emphysematous crepitation is often obtained. Upon cising such a point, a discharge of fetid gas and grumous matter fol-ws the puncture, and this peculiarity has more than once led surgeons believe that they had opened a knuckle of intestine.

Perforative Ulceration of the Appendix.—The symptoms of this isastrous condition closely resemble those of perforation of the anteior part of the cœcum. They are, however, often even more acute, he pain is sudden and violent, and a distinct tumor is more uniformly resent; while, on the other hand, the symptoms of obstruction of the ntestine are not so well developed. Constipation and vomiting are ot constant in the early stage, and at a later period spontaneous diarhœa may appear, but without any favorable result. The perforation f this part is, as already said, far more apt to be followed by general eritonitis; and, indeed, so far as we know, there is but one well-authenicated case on record of recovery after this accident, which was pubished by one of ourselves in the *Proceedings of the Pathological Society f Philadelphia.* (See *Amer. Jour. Med. Sciences*, vol. liv, July, 1867, p. 45.)

Perityphlitis, or inflammation of the pericœcal tissue, when it does ccur independently of typhlitis, is ushered in by pain, with deepseated enderness in the right iliac region. There is also some fulness of this art, but not the formation of a distinct tumor, as may frequently be etected in typhlitis. There are usually colicky pains in the abdomen, ith either constipation or diarrhœa, and with a moderate degree of febrile excitement. This disease, when judiciously treated, freque seems to terminate in resolution; when, however, suppuration occ the symptoms will approximate those given above, and the abs which forms may discharge itself externally, into the bowel or into peritoneal cavity.

Duration.—Many attacks of acute typhlitis, when promptly judiciously treated, yield on the second or third day; though the c is often prolonged to the ninth or twelfth day, and, in violent attac it may be many weeks before all local tenderness in the cœcal reg passes away, and the function of the bowel is again completely restor

When perforation of the cœcum occurs, the after-duration of the c depends entirely upon the point of perforation. If the ulcer have p etrated the anterior wall, general peritonitis is usually excited, death results in less than forty-eight hours. But if, on the other ha the posterior wall be perforated, a fecal fistula may be formed, and c tinue open for very many years. The duration of perforative ulc tion of the appendix varies considerably. In 3 cases in children, served by ourselves, the duration was respectively seven, nine, fourteen days, with a mean of ten days.

In 11 cases, at all ages, in which the duration is distinctly stated, mean duration was nine days, the extremes being two and a half twenty-nine days.

Bamberger, however, gives the duration of seven cases, occurrin various ages, at from twenty to fifty days, with a mean of thirty- days. It is probable, however, that this last mean is rarely attai in cases occurring in children.

Prognosis.—Nearly all cases of simple acute typhlitis, without foration of the bowel, recover under proper treatment. Indeed, th are no cases on record of acute typhlitis proving fatal, in which p mortem examination did not show the existence of perforation of cœcum or appendix.

When the cœcum has become the seat of chronic inflammation, h ever, death may result, either from the sudden development of ac peritonitis, without perforation of the bowel, or from such contract of the cœcum as finally to lead to obstruction of the intestine.

When perforation of the cœcum does not prove speedily fatal fr peritonitis, but leads to the formation of an abscess in the iliac fo the prognosis of the case depends, in a considerable degree, upon course taken by this abscess. Dupuytren regarded the reopening the bowel as the safest termination of an iliac abscess, and the open upon the surface of the body as almost universally fatal. Further perience has confirmed the truth of the first portion of this opinion, has also established the fact, that almost one-half of the abscesses o ing externally recover.

Perforation of the appendix vermiformis is invariably fatal, so fa our experience goes, if we except the case before referred to, wher an old man about whose past history nothing could be learned the appendix converted into a solid fibrous cord, with a small ing, near the free extremity, leading to its centre.

IAGNOSIS.—The general diagnosis of most of these conditions is not nded with much difficulty. We have already mentioned that simple ssive distension and impaction of the cœcum is sometimes attended severe pain, some tenderness, constipation, and even vomiting, that these symptoms are relieved upon free action of the bowels g secured. We do not have here, however, the sudden attack urring in a state of perfect health, as in typhlitis, nor the marked rile symptoms; nor are the local signs in the right iliac fossa, especially the peculiar, exquisite sensitiveness, nearly so well de- oped.

nflammatory disease, in connection with the right ovary, with local itonitis, is unquestionably sometimes mistaken for typhlitis. The al symptoms in the former affection are, however, lower down in the lomen than is usual in typhlitis; there is not the well-defined tumor the obstinate constipation; and, in addition, there is generally the tory of some menstrual trouble, or the attack occurs in immediate nnection with the period of menstruation.

Pain in the course of the last dorsal nerve may arise from spine dis- e, or, in the course of the genito-crural nerve, from the passage of a al calculus, and, according to Habershon, be confounded with cœcal ease. It is evident, however, that most of the characteristic symp- ns of typhlitis would be absent, whilst a careful investigation of the e would probably educe more symptoms of the existing trouble.

The diagnosis of typhlitis from intussusception, an affection which esents many features of resemblance, will be fully considered in the ticle devoted to this latter disease.

Ulceration of the cœcum or appendix may be suspected, if the violent in and the exquisite tenderness persist in the right iliac region, after other symptoms of an acute attack of cœcal disease, especially the miting and constipation, have been overcome. Ulceration of the cum is much more apt to have been preceded by bowel complaint some time; it is also much more rare than ulceration of the ap- ndix.

In cases where we are consulted only after perforation has taken ace, with the production of a fecal abscess, we must endeavor, by taining a most accurate history of the case, to establish the presence absence of symptoms of inflammation of the cœcum at the begin- ng. And further, care must be taken to exclude the following con- tions, all of which may at times simulate iliac abscess, namely: psoas scess, or abscess connected with caries of the pelvic bones; abscesses the walls of the abdomen, with local peritonitis, resulting from ows; suppuration originating in connection with the right kidney or envelope; and finally, some cases of disease of the right hip-joint.

The differential diagnosis of these affections of the cœcum and ap- ndix from one another is as yet scarcely possible. The following neral remarks contain, perhaps, all that can be surely advanced:

Simple inflammation of the appendix presents symptoms of greater acuteness and severity than those of simple cœcitis, and do not subside so promptly after the bowels have been freely upon.

In ulcerative disease, both of the cœcum and appendix, the symp also persist after the constipation and vomiting have yielded.

Ulceration of the cœcum, however, is rare, and is apt to be prec by symptoms of bowel complaint. Whilst ulceration of the appen on the other hand, is often terribly acute, advancing from a sta apparent perfect health to perforation and death in forty-eight ho it is also much more frequently attended with a distinct tumor in right iliac region.

Treatment.—The indications for treatment in the acute stag typhlitis are clearly to reduce the local inflammation of the periton and intestine, to relieve the pain and tenderness, and to secure free natural action of the bowels. At the same time, all perturbating strongly reducing treatment is forbidden, by the knowledge that attack is frequently caused by an irritating foreign body: and tha a certain number of cases, perforation will occur, in which event only hope of recovery often rests upon the adhesions which have formed during the early stage, and upon the vigor of the constitu to resist a prolonged and exhausting process of suppuration.

Depletion.—The local abstraction of a few ounces of blood by the plication of leeches to the cœcal region, should be practised in a cases. This measure, while it does not seriously reduce the strengt the patient, relieves the pain and tenderness, and probably facilit the action of the internal remedies employed. Beyond this deg however, depletion is injurious, or, at least, unnecessary.

Purgatives.—The experience of all observers agrees in condem the use of powerful, irritating purgatives at any stage of typhlitis. the early stage, they aggravate the pain and inflammation, increas establish vomiting, and frequently fail entirely in their object; w on the contrary, the constipation which will resist the strongest, drastic purgatives, will quickly yield to mild, saline, or veget laxatives.

It is a good plan to combine a small amount of opium with the ative; since, so far from counteracting its operation, it appears, allaying the intense sensitiveness of the bowel, to promote its pain and thorough action.

Burne recommends highly the following laxative draught, the of which is arranged for an adult:

℞.—Sodæ Sulphatis,	ʒj.
Tr. Opii,	gtt. v.
Inf. Sennæ,	f℥j.

Ft. sol. S.—Repeat every four hours until the bowels are freely moved.

We have ourselves been led by experience to rely upon the com tion of comp. ext. colocynth with opium, given in small and freque

d doses. Thus, for a child of from five to eight years, the fol-
pill may be prescribed:

℞.—Pulv. Opii, ... gr. ij or iij.
Ext. Colocynth. Comp., ... gr. xij to xviij.
Ft. mas et div. in pil. No. xxiv.

-One every three or four hours until free action of the bowels is secured.

nata.—The action of these laxatives may be furthered by the
istration of large enemata, which may consist either entirely of
water, or of water containing a small proportion of some stimu-
or laxative substance, such as soap, molasses, or castor oil. In
where the irritability of the stomach precludes the administra-
f laxatives by the mouth, enemata become especially important,
t times their use will be followed by the most happy results, the
ting contents of the cœcum being brought away with almost im-
te relief to the most threatening symptoms.

cury.—It is difficult to support the practice of giving this drug in
itis. In the early stage, indeed, when it may be supposed that the
inal canal contains irritating ingesta and secretions, a small dose
omel or blue pill may be administered; and, in a large number of
uccessful cases on record, this was done. It is not, however, at
cessary. Beyond this, the further use of mercury appears to us
ous, since, if it be given until any constitutional effects are pro-
l, it must have a tendency to prevent the formation of those strong
ions which constitute the sole chance of recovery in case of per-
on of the appendix or the anterior wall of the cœcum.

ium.—We have already mentioned the way in which opium is most
ntageously given in this affection, in combination with the laxative
oyed. Its use is absolutely called for, and the violence of the local
toms, the pain and exquisite tenderness, form the best guide as to
mount required.

ultices and Counterirritants.—In case even the local abstraction of
appears undesirable, resort should be had to the frequent appli-
n of mustard plasters or turpentine stupes to the cœcal region.
fomentations or light poultices, to which some sedative substance
be added, should be kept constantly applied to the abdomen.

miting when present, should be allayed by counter-irritation, by
lowing small fragments of ice, by carbonated drinks, hydrocyanic
or any other suitable remedy.

e diet during the early stage should be fluid, and unirritating in
acter.

hen the persistence of the symptoms leads us to apprehend the
nce of ulceration, either of the cœcum or appendix, all depletory
perturbating treatment should be abandoned, and we should limit
fforts to the relief of pain, by the use of opium and the continued
cation of poultices; to regulating the functions of the intestinal
, and to the sustentation of our patient's strength.

perforation has occurred, without the speedy development of

general peritonitis, our attention should be mainly directed to supp
ing the system during the long and exhausting process of suppura
which must ensue. For this purpose a generous, though digestible
with as much stimulus as appears necessary, should be enjoined:
resort may also be had to the various tonics, as quinia or the pre
rations of bark. If a tumor forms, and it becomes evident that
abscess is tending to discharge externally, its approach to the surf
should be encouraged by poulticing; and the moment an emphyse
tous condition of the skin is detected at any point, a free incision sho
be made, and the discharge of matter furthered by the introductio
a sponge-tent or a pledget of lint, and the application of a poultice.

In those unfortunate cases where the perforation of the bowel
been followed by general peritonitis, all treatment is unavailing.
main reliance must, however, be placed upon the exhibition of opi
and the use of counter-irritation.

ARTICLE VI.

INTUSSUSCEPTION.

Definition; Synonyms; Forms; Frequency.—Obstruction of the
testinal canal, from one or another of the numerous causes capabl
producing it, is an accident liable to occur at all periods of life.
the variety of it which forms the subject of this article is of rare oc
rence excepting in early childhood. It has been called ileus, volvu
miserere mei; but is best known under the descriptive names of in
susception or invagination of the intestines. It consists in the pass
or introduction of one portion of intestine within another, as a sm
tube might slide into a large one, or, to borrow a familiar illustrati
as the end of a glove finger may be pushed back upon itself into
glove. This simple invagination, however, is not the only elem
present, for in order that the symptoms of intussusception should
produced, it is necessary that the included portion of bowel should
so incarcerated and constricted as to give rise to more or less compl
intestinal obstruction. This has led to a very just division of intus
ceptions into such as are slight, unattended by inflammation, or sp
modic; and such as are grave, or attended by inflammation and in
ceration. The slight form of invagination is found very frequently
autopsies of children who have died of other diseases, and in wh
during life there was no symptom of disturbed function of the alim
ary canal: it is in all probability produced in the death agony.

M. Louis states that the greater part of 300 children dying du
the period of dentition at the Salpêtrière, had 2, 3 or even 4 vol
without inflammation.

Baillie, Cheyne, and Billard speak of such intussusceptions as b ently found at the autopsies of children; and Burns, as quoted by am,[1] gives the results of the autopsies of 50 children who had died diarrhœa, in every one of which they were found. This species vagination in children occurs almost exclusively in the small in- ine; the invaginated part is usually of no considerable length; and very slightest traction suffices to restore it.

he grave form, on the other hand, differs from this alike in the very itive symptoms by which its presence is announced, in the condition he parts involved, and in the part of the bowel affected; and as the m first mentioned scarcely deserves to be called a disease, it is to the er alone that the following remarks are addressed.

requency.—Although numerous well-authenticated cases of intussus- tion occurring in adults are on record, statistics prove that it is atively much more frequent during the first four years of life. us of 100 cases given by Duchaussoy[2] in which the age is men- ned, there were 31 under 4 years of age, 6 between 4 and 10 years, 63 adults. Smith's[3] tables go to show that "this complaint is rare der the age of 3 months, and that the period of greatest frequency is m the third to the sixth month of life, the maximum number being the fourth month." Thus there were 11, of the 50 cases collected him, at the age of 4 months, or 21 in all between 3 and 6 months lusive; 8 from 6 months to 1 year; and only 18 between the ages of nd 12 years.

We must, however, call attention to the rarity of this disease at any e among us; for although, in the course of a very extensive practice ong children in this city, we have met with several well-marked strations of the various forms and terminations of intussusception, has been one of the rarest occurrences in our experience.

ANATOMICAL APPEARANCES.—Intussusceptions, anatomically consid- ed, may be divided into descending or progressive, and ascending retrograde, according to the direction which the invaginated por- n takes; and into central or lateral, according as the entire intes- ne, or but one wall, is invaginated. Lateral invaginations, how- er, are exceedingly rare, occurring but twice in 137 cases collected Duchaussoy.

Excepting when invagination occurs as a complication of some other fection, it is almost invariably of the descending form. Thus, of Du- aussoy's 137 cases, only 16 were retrograde, all of them being com- icated; and Haven gives but 3 instances of ascending intussusception t of 59 cases.

It is a matter of considerable importance to determine what is the ost frequent seat of intussusception in children. Rilliet and Barthez[4] declare that in infants the small intestine is almost never the seat intussusception, but that ordinarily it is the lower end of the ileu which is invaginated into the large intestine. The reasons for th are found in the anatomical conditions of the intestines in infancy the adhesions of the cœcum to the right iliac fossa being much mor limited and less powerful than in later life; and the muscular coat the cœcum being but slightly developed in childhood, a circumstan which must also tend to favor the passage of the lower end of the ile through the valve.

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[1] Guy's Hosp. Reports, 1st series, vol. iii, 1838, p. 330.

[2] Duchaussoy, Mém. de l'Acad. de Méd., vol. xxiv, p. 97 (New Syd. Soc. Year- ok, 1863, p. 294).

[3] Smith, Statistics of Intussusception in Children (Am. Jour. Med. Sci., vol. xliii, 2, p. 17).

[4] Mal. des Enfants, 2ème ed. tom. i, p. 806.

The statistics of Duchaussoy and Smith confirm this opinion; as 31 cases of simple descending intussusception in children under 4 yea of age, collected by the former, the large intestine alone, or both th large and small, formed the intussusception in all but 4 cases; an Smith states that he has found no exception to Rilliet's remark, regards early infancy. In children above the age of 2 years, fatal invagination in the small intestines may occur in rare cases. In a fe cases also, the ileum has preserved its normal relations to the ileo-cœcal valve, the cœcum being the first part inverted, and drawing afte it the lower end of the ileum.

An intussusception, then, is made up of three folds of intestin 1st, The inner, or contained part, which in descending intussusceptions is always in the natural direction; 2d, The middle, which is reflection of the inner, and passes in a direction contrary to the intussusception; and 3d, The outer, containing part or sheath, which is its natural position, and in the direction of the intussusception. W find, therefore, the mucous membrane of the middle and outer parts apposition; and the peritoneal investment of the middle and inner part in contact.

The amount of intestine invaginated and the condition of the part depend, in great measure, upon the duration of the case. If deat takes place early, only a small portion of the ileum may have pass the valve; but as the case progresses, the tenesmus or the active peristaltic action of the outer part, brings down more and more of the ileu with its accompanying mesentery, until finally, the constriction of th ileo-cœcal valve preventing the descent of any more of the ileum, th cœcum is inverted and forced into the ascending colon. This in tur may be invaginated in the descending colon and rectum, until not unfrequently a portion of the invaginated intestine protrudes from th anus. In rare cases, the whole invaginated mass descends into the intestine below, thus forming a double intussusception of great thicknes It has occurred, in a few rare cases, that the amount of constrictio was so slight that the intestine remains pervious to a certain exten so that life has been protracted for many weeks, and death has finally ensued only from exhaustion. But ordinarily the parts are in the following condition: the intestine above the point of constriction is distended with gaseous and fecal contents, and more or less discolore from congestion of its walls. It is rare, however, to find any evidences enteritis either here or in the intestine below the intussusception, whic nerally pale and contracted. The invaginated portion itself, at the er part, where it seems to plunge into the containing portion of the stine, presents a series of concentric circular folds. The walls of bowel thus incarcerated are thickened and infiltrated; their serous estment either deeply injected or discolored by congestion and hymosis, so as to be of a deep blackish-red color; and frequently dences of local peritonitis are present. The mucous membrane in es of short duration may be merely thickened and injected, but more quently it is turgid from congestion, ecchymosed in points, and shows effects of violent inflammation by its unequal roughened surface, senting either ulcerations or grayish false membranes The capil- ies of the constricted portion become greatly distended, so that, ecially in young children, in whom the vascular rete of the intes- es is remarkably rich, whilst the tissues are delicate and yielding, y frequently rupture, filling the invaginated intestine with blood, d producing bloody discharges.

f the case is protracted and the powers of life sufficient, when treat- nt has not sufficed to reduce the intussusception, nature endeavors to ect a cure by eliminating the invaginated portion. The incarcerated wel becomes gangrenous, a line of separation forms, union and cica- zation take place between the part of the bowel above the intussus- ption and the upper part of the containing intestine, and the invagi- ted portion is discharged per anum. This process of elimination is tremely rare in infants; but it is stated by Rilliet to be the ordinary thod of cure in children in their second infancy. In 59 cases re- rted by Haven,[1] of all ages, discharge of the intestine per anum took ce 12 times, with recovery in all but two cases. The average length intestine passed in these cases was 23½ inches; in the two fatal cases, portions passed were respectively 39 and 44 inches long. The earli- age at which we have met with this process of cure, is at 13 months a case reported by M. Marage.

In the report of the *Proceedings of the Pathological Society of London*, l. xiii, a specimen is described by Dr. Hare, where this process had ken place. The patient was a female, 41 years of age, and her death sulted from tubercular disease three months subsequently to the pas- ge of the sphacelated bowel, "which was 6½ inches in length, of a very rk purplish-gray color: it formed a perfect cylinder, but the intestine as turned inside out, the exterior of the specimen, as voided, being the ucous membrane, and the interior of the cylinder being the peritoneal vering of the intestine."

At the autopsy, at the point where the invaginated portion had been parated, about fifteen inches above the cœcum, the line of union was und running obliquely across the intestine, "but the union was so rfect that it could scarcely be detected except by holding up the in- stine between the eye and the light, when the thinness of the intes- ne clearly pointed out the line or seam where the union had taken

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[1] Haven on Intestinal Obstruction, Amer. Jour. Med. Sci., vol. xxx, 1855, p. 351.

place. Exactly at the point of union the intestine was notab
rower than natural; but the intestine above this point was a li
lated."

We have recently had an opportunity, through the courtesy o
A. Stillé, of studying a specimen in which a similar process of cu
been effected. The patient was an adult, who died of some chro
ease, and no history could be obtained of the occurrence of the
of intestinal obstruction, or of the discharge of the sphacelated
of bowel from the anus. The specimen, however, presented a
ances which left no doubt that invagination of a portion of the
had occurred, that the invaginated portion had sloughed awa
that union had taken place between the intestine, just above the
susception, and the upper part of the sheath, so as to preserve t
tinuity of the bowel. The external surface presented a marke
striction encircling the intestine, due to the entrance of the upp
of the bowel into the sheath. There was a layer of organized
investing the peritoneum at the line of junction, and firmly uniti
two serous surfaces. Upon laying open this part of the ileum, a
rim of indurated tissue, evidently the altered intestinal wall, pr
downwards into the intestine from the line of constriction, and f
as it were, a perforated diaphragm across the calibre of the bow

We thus see that even when the slough is cast off, and the
recovers from the intussusception, the cure is not always pern
since in a small proportion of cases there may be serious contrac
the bowel, caused by the ensuing cicatrization.

In addition to the modes of recovery already adverted to, n
the reduction of the intussusception either by the movements
bowel itself or by the remedial measures adopted, and the elim
of the invaginated portion, there is still a third mode possible, in
the intestine remains invaginated, but by agglutination of the
folds, becomes pervious, and undergoes such atrophy and cont
as not to interfere materially with the functions of the bowel.
and Barthez, as well as other Continental authors, speak of th
occasional occurrence, but we have not found any well-authen
cases recorded.

There are few morbid changes found in intussusception exc
those pertaining to the intestines. It is, however, worthy of m
that in some cases the invaginated mass appears to produce
compression of the large vessels of the abdomen.

CAUSES; *Age.*—We have already given the statistics which pro
intussusception is relatively very much more frequent during t
four years of life, the period of maximum frequency being betw
third and sixth months. It is very rare before the age of three n
All forms of invagination, however, do not occur with equal fre
at these various ages. During early infancy, for the anatomical
already assigned, the almost invariable seat of the invagination
lower end of the ileum and the upper part of the large intestine;

e age of two years, invaginations of the small intestine alone,
still very rare, may occur.

-All statistics agree in giving a majority of males over females,
in the proportion of 2 to 1; while in some tables the propor-
as high as 7 to 1; thus Rilliet and Barthez collected 25 cases, of
22 were boys.

ious Condition.—In by far the majority of cases, intussusception
infant occurs as an idiopathic affection, appearing during perfect
In children over one or two years of age, however, it is much
pt to be preceded by some disturbance of the alimentary canal,
stipation, diarrhœa, dysentery, or even by symptoms of imper-
struction of the intestines.

ssusception may also occur during the course of other diseases,
case quoted by Rilliet from Legoupil, where the invagination
ed during the progress of variola; the child, 4½ years old, re-
d.

ting Causes.—External violence, as blows upon the abdomen, or
jerking of the child's body, as in tossing it in the arms, are as-
as the probable exciting cause of a certain number of cases. It
en supposed, also, that violent fits of coughing or screaming, or
straining at stool, have produced invaginations, especially in
oung children.

roper alimentation and sudden changes of diet appear to act
requently as efficient causes; thus in a case reported by Gorham,
ing in a healthy infant of four months old, the only assignable
was the administration of panada for three days preceding the
. It is, however, frequently impossible to assign any plausible
for the sudden production of severe intussusceptions.

nting, however, the presence of any of these causes, the question
mains as to the exact mechanism of the invagination. Accord-
Gorham, "it is necessary to the production of an intussusception
here should be either: 1st, A contraction of the part to be intus-
ted; or 2d, A dilatation of that part which is to be the outer fold;
A natural and sudden inequality of calibre of some portion of
testinal tube. The first of these conditions may be produced by
; the second by flatus; whilst the third is always present at the
nation of the ileum in the cœcum." It is at this point, accord-
that intussusception most frequently occurs, and, from the ana-
al arrangement of the parts making it very difficult for restitution
ur, puts on its most dangerous and fatal characters.

invagination having once begun, its increase and persistence
obably due to the active peristaltic action of the outer fold, aided
spasmodic contractions of the diaphragm and abdominal mus-
ausing the powerful tenesmus so frequently observed.

re is one more question in regard to the etiology of this affection,
which various opinions have been expressed; whether, namely,
tis holds the relation of cause or effect to intussusception. Rilliet
arthez appear to us to have given it its true importance in stat-

ing that it sometimes plays one part and sometimes the othe
have already seen that, though in many cases intussusception
suddenly in full health, there are a sufficient number of instances
the attack has been preceded by symptoms of intestinal irritat
inflammation, to make it clear that at times enteritis acts as a
posing or determining cause. And, on the other hand, the patho
anatomy of the disease, showing the inflammation of the bowe
limited to the immediate vicinity of the invagination, and to
more intense as the constriction is tighter, proves that enterit
quently appears as a result of intussusception. This becomes
ally evident in those cases where the disease has been caused by
nal violence, and where after death the above conditions have
noticed.

Symptoms; Duration; Terminations.—The principal sympt
intussusception are furnished by the gastro-intestinal apparatus
towards the termination of unfavorable cases, by the nervous s
We have seen that a considerable difference exists in the seat
invagination at different periods of childhood, and in examini
symptoms we find a corresponding disparity, according as the
susception occurs in the first infancy, under the age of two years
the second infancy, between the second and sixth year. These
of difference will be mentioned as each symptom is discussed.

The most important and characteristic symptoms are: vomitin
stipation, and bloody discharge from the anus; abdominal pain,
mus, and protrusion of the intestine, the presence of a tumor
abdomen, and tympany.

Vomiting is an almost constant symptom, being present in ab
per cent. of the cases. Very rarely the gastric disturbance an
only to nausea, but nearly always vomiting sets in early in the
and persists, despite all treatment, until either the invagination
lieved, when it promptly ceases; or until the approach of death.
frequently it ceases a day or two before the fatal event occurs.
matters vomited at first consist of the ingesta, the stomach re
everything taken into it; soon, however, they become mixed wi
cus and bile. In very young children it is rare for stercoraceou
iting to occur, but in those who are above two years of age it m
casionally be present. In Smith's 50 cases, it occurred in three
respective ages of 3, 6, and 11 years.

The condition of the bowels is generally one of obstinate *consti*
so far as the passage of fecal matters is concerned. It is not u
for one natural abundant stool to occur after the intussusception
but this is succeeded by constipation. It is only in those ver
cases where the invaginated portion remains pervious, that a
amount of fecal matters finds its way into the stools.

The discharges which, however, do take place almost invari
intussusception in children are due to the rupture of the capill
the constricted bowel, and consist of blood mixed in varying
tions with mucus and serum. It is rare for the blood to be so d

ptom, and in 1 only is it recorded as absent. In case No. 2, of bham's table, a child of 3½ months passed within a few hours an a teacupful of fluid blood. In older children, on the other loody discharges occur less frequently; thus Smith records 18 invagination between one and two years, in only 6 of which it d that there were bloody motions.

ave already mentioned the various ways in which recovery lace, and when elimination of the invaginated portion is about , which is almost exclusively limited to cases occurring in the infancy, the stools become highly fetid, contain more or less re blackish or brownish in color, and are soon accompanied by harge of the slough. The interval elapsing between the inception the attack and the discharge of the portion of bowel, varies cony in different cases, but seems to be less in childhood than in ge. Thomson states that in adults the elimination takes place ajority of cases within thirty days; and in one of his cases it d as early as the sixth day. In children the interval rarely exelve days; and the average of all recorded observations would fix about nine days as the usual time.

inal pain is among the earliest and most constant symptoms at . During the early part of the attack, it appears in paroxysms; y be detected even in the youngest children, by the violent smal screaming, and contortions of the limbs and trunk. At the ncement, the abdomen is generally relaxed, supple, and indolent; is condition may remain until death, perhaps because the con in some cases is not complete and allows the passage of gas. er a few days, there is apt to be more or less continuous pain eness on pressure in the part of the abdomen corresponding to agination, due to the local enteritis and peritonitis. This may not be accompanied by tympany and diffuse tenderness of the

Tumor.—It would appear natural that when a considerable intu ception has taken place, the knot formed at the point of obstru should be readily detected through the abdominal walls. And ye cases on record show that this tumor is recognizable in not more two or three out of every ten cases. When it can be detected, generally found in the left iliac region, varying in size from a wa to a large goose-egg, and giving the sensation of a solid, but dou and compressible mass. It is ordinarily quite movable, and percus elicits a dull note over its position.

Another symptom depending upon the displacement of the intest to which considerable importance has been attached in the diagnos invagination in the adult, is a depression of the abdomen at a point responding to the displaced intestine, and a fulness at the corresp ing point on the opposite side. Experience has shown, however, but little value can be attached to this sign in young children, on count of its great rarity.

We have seen that the presence of a tumor in the abdomen is far an invariable sign of intussusception, and the same remark applie the *protrusion of the invaginated bowel from the anus*, a symptom to w very different diagnostic value has been attached by different auth It is stated by some to be almost never present, but we have fou recorded particularly in six of Smith's cases, the same number in w an abdominal tumor was present in the same series; and in three o cases, although no tumor protruded from the anus, the invaginated was readily felt by examination per rectum.

When the bowel protrudes, it forms an oblong tumor, at times two inches in length, much congested from the constriction, and sme with blood and mucus.

When we pass from these positively diagnostic symptoms, we little elsewhere characteristic of the disease. The tongue is not until inflammatory action sets in, when it often becomes dry and bro the appetite is impaired or absent, and the thirst is generally but mo ate. Rilliet and Barthez call attention to the importance of this symptom in a diagnostic point of view, as well as to the fact that emaciation is usually not so marked as in other acute diseases of e duration and severity.

The amount of febrile action is generally slight in infancy; the face, cool at first, may at times become hot, or is alternately hot cold, and as death approaches remains continuously cold. The p soon becomes frequent, though small and feeble. There is no mat disturbance of respiration.

In older children there is apt to be more febrile action, the skin b hot until late in the attack, and the pulse frequent and more full. physiognomy of the little patient is greatly altered from the comme ment of the attack. The eyes are dull and languid, sunken in thei bits, and surrounded by discolored areolæ; the countenance is exp sive of the most profound prostration, so as to have elicited a compa to the physiognomy of cholera patients.

Almost all cases, at whatever age, present symptoms of marked dis-
rbance of the nervous system, as great restlessness, indescribable
alaise, sharp cries, and, toward the close of the case, profound pros-
ation. But in infancy, in addition to these symptoms, the case is
ore apt to present an attack of convulsions, either as one of the earliest
mptoms, or toward death, alternating with coma.

Duration.—It is necessary to distinguish here between cases occurring
ring extreme infancy, when we cannot hope for elimination to take
lace, and those in more advanced childhood. In early infancy, when
e attack is about to take a favorable turn, the symptoms usually yield
from two to four days, owing to reduction of the invagination. In
tal cases, death occurs within five days, as the rule. In some cases,
owever, where the constriction was not complete, life has been pro-
nged even for six weeks.

In second infancy, where the constriction is complete, and the result
tal, death occurs within seven or eight days in the vast majority of
ases. But when elimination is to result, the case is more protracted,
nd complete recovery is postponed to the third week. Thus, in 7 cases
ut of Smith's statistics, which resulted favorably by sloughing, the
ges were 5, 6, 6, 9, 11, 12, and 12 years respectively; and the separa-
ion of the invaginated portion took place between the ninth and twelfth
ays, with an average of nine and a half days. After the discharge of
his, which is soon followed by the fetid, brownish-black stools already
escribed, the symptoms rapidly disappear, and in one or two weeks
he cure is complete; so that, if we can carry a patient, advanced be-
ond the first infancy, through the first week of the attack without
oo much exhaustion, we may each day look for the discharge of the
nvaginated bowel, the restoration of the function of the intestines, and
ltimate recovery.

Terminations.—We have already described the favorable modes of
ermination, namely, by the subsidence of the intussusception, either
pontaneously or as the result of treatment; by restoration of the
alibre of the bowel by sloughing of the invaginated bowel, and union
and cicatrization of the divided edges; and finally, by agglutination of
he outer layers of the invaginated portion with subsequent thinning
and atrophy, thus rendering the intestine pervious, although the in-
ussusception remains.

In those cases in which death takes place very early, as on the first
or second day, it is frequently produced by cerebral congestion or an at-
tack of convulsions. In the majority of cases, however, it occurs some-
what later, and is preceded by a state of collapse. Even in those cases
where the constriction is not at first complete, and where there are
daily feculent evacuations for a time, death is apt to occur from ex-
haustion, or from the invagination becoming more extensive and symp-
toms of complete obstruction arising.

PROGNOSIS.—A single glance at the character of the lesion and the
accompanying phenomena, suffices to assure us of the grave nature
of intussusception, and of the impotence of all ordinary methods of

treatment against it. In young infants, indeed, where the strength of the system cannot be expected to hold out until elimination occurs, intussusception is almost invariably fatal. In a single instance only has recovery by elimination been noticed so early as the end of the first year. In a few cases, where the symptoms were well developed and threatening, they have subsided and the infant has recovered, apparently from spontaneous reduction of the invagination.

We must not, however, forget that during the early stage of this affection the diagnosis is somewhat doubtful, since young children frequently present symptoms of obstructed and loaded intestine, such as a distended, hard abdomen, constant unnatural straining, with evident suffering, and yet are entirely relieved after the administration and operation of laxatives.

A few cases of cure of undoubted intussusception, by means of inflation, have also been reported even at this early age; so that, when treatment is instituted soon after the appearance of the symptoms, the case is not absolutely hopeless. In older children, that is to say, above three years of age, the prognosis is much less unfavorable, since treatment offers a certain amount of hope, and there is always the prospect of the occurrence of elimination of the invaginated bowel, if the strength of the patient has been sustained during the first week.

Even after elimination has taken place, however, the prognosis should still be somewhat guarded, as the slightest indiscretion in diet may, either by the development of flatulence or by the escape of irritating undigested particles into the intestine, cause a rupture of the recently formed cicatrix and speedy death.

Diagnosis.—Intussusception has been, until recently, regarded by all authors as an affection of obscure and doubtful diagnosis. With the light, however, which has been thrown upon this subject by the labors of Clarke, Gorham, Smith, and especially Rilliet, the diagnosis in the great majority of cases can be made with precision. It is true, however, as conceded by Rilliet, that "very rarely in early infancy, more frequently than later, there are certain cases of invagination impossible to distinguish from other forms of intestinal obstruction; and that at all periods of childhood the diagnosis presents many difficulties."

With what diseases, then, could we confound this affection, occurring, as we have seen, suddenly in perfect health; attended by obstinate, though rarely fecal vomiting; by marked constipation, but with frequent bloody discharges; by paroxysmal abdominal pain and tenesmus; by the presence of a tumor, generally in the left iliac region; by the protrusion of the invaginated bowel from the anus; and by profound prostration and disturbance of the nervous system. It is to be remembered, indeed, that this group of symptoms, so characteristic when viewed together, are rarely all present; and that with the exception of the vomiting, constipation, and bloody discharges, there is no single symptom which is not more frequently absent than present. There

e of intussusception. There is frequently such gastric and intes-
rritation, as to lead to occasional vomiting and paroxysmal ab-
al pain; the bowels are constipated, and there is frequent and
tenesmus, so as often to cause protrusion of the bowel. In addi-
these symptoms, a well-defined tumor is present in one or the
liac fossa.

se cases, however, often have presented symptoms of intestinal
bance for some time previous to the attack; the vomiting is
so constant as in intussusception; the tumor is quite painless
as a peculiar doughy consistence; bloody discharges from the
are very rare; and we do not notice the profound prostration
exists in well-established invagination. During the early stage
case, however, the diagnosis is doubtful; and when we have
to suspect the presence of fecal accumulations, we must await
sult of the administration of laxatives and laxative enemata,
deciding upon the nature of the case.

Inflammation of the cœcum, appendix vermiformis, or of the
cal connective tissue, is attended with fulness or a well-defined
in the right iliac fossa, with vomiting, constipation, and occa-
y tenesmus, with distension of the abdomen and pain radiating
he right iliac region.

re is, however, a marked degree of fever, and the symptoms of
eritonitis appear early in the case; the patient assumes a char-
stic position, with the thighs flexed upon the pelvis, and the right
ssa is the seat of exquisite tenderness, so that the slightest pres-
annot be tolerated. The vomiting and constipation are not so
d and obstinate, and excepting in those cases which have been
led by dysenteric symptoms, there are no bloody discharges, and
have remarked above, the tumor or fulness is in the right iliac
whereas when this sign is present in intussusception, it usually

past forty years does not seem to have been much practised.
of obstruction of the bowels, occurring in adults, successful
by inflation, are reported in the *American Journal of Medica*
for 1833: one by Dr. Janeway, of New York; the other, wl
ever, was transcribed from the *Glasgow Medical Journal*, fo
Dr. King. The following year, in the *Boston Medical and Sur*
nal, December 15th, 1834, Dr. J. Wood published a case,
adult, where death seemed imminent, but where the obstru
readily overcome by inflation, and the patient recovered. S
this remedy has been frequently employed in intussusceptic
dren, and with such good results, that it may fairly be sai
prognosis of this affection is less grave since the introducti
remedial measure. To obtain the best results, inflation shou
ployed early in the case, before any considerable amount o
inflammation has taken place between the sheath and the
intestine. The air is readily introduced by a pair of ordinar
the nozzle being inserted well into the rectum, and inflation
until the obstruction yields. The return of the invaginated
is sometimes attended by a clearly audible sound, a species
but it never gives any pain, and has generally seemed to aff
The complete restoration of the calibre of the intestine is pro
copious feculent stools which frequently come away soon aft
flation.

A third mechanical means for restoring the displaced int
been recommended by Dr. Nissen, and consists in pushing
vaginated portion by means of an œsophageal sound prote
sponge. This proceeding would probably be readily accom
the intussusception occurred far down in the large intesti
would appear very difficult to replace in this way an invagi
high up as the ileo-cœcal valve. Dr. Nissen, however (in th
de Constatt, quoted by Rilliet and Barthez), gives two cases

certaining the exact position of the intussusception; the difficulty of restoring the invaginated intestine even if found; and finally upon the dangers of the operation.

We have seen, however, that in the majority of cases the invaginated mass will be found in the neighborhood of the left iliac fossa; the lower end of the ileum having traversed the cœcum, ascending and transverse colon, and these parts being successively inverted; that in a certain proportion of cases a tumor is readily detectable; and further, that some idea as to the seat of obstruction may be obtained from the distance to which enemata appear to penetrate. So that in a considerable proportion of the cases, we have the means of localizing the point of constriction, with a certain amount of definiteness.

In regard to the difficulty of reducing the invaginated parts, authors differ greatly. It has been remarked, that even if the equivocal and uncertain nature of the symptoms of volvulus were not sufficient to deter us from undertaking the operation, the state of the invaginated parts would entirely banish all thoughts of such an imprudent attempt; since the different folds of intestine become so agglutinated to each other that they can hardly be withdrawn, even after death.

Rilliet and Barthez (*loc. cit.*), however, conclude from their anatomical researches, that in the majority of cases the disengagement of the intestines is very easily accomplished; and accordingly they declare that, "after employing medical treatment during three or four days, and after having made several attempts at inflation, we should not hesitate to perform gastrotomy."

The great danger of the operation is, of course, apparent, but should hardly be considered an objection, when we consider the fatal nature of this affection. Nor have the results of operation been such as to destroy hope; for in addition to several successful operations previously recorded, the only 3 cases of the 57 collected by Haven, in which gastrotomy was performed, terminated favorably.

To sum up our remarks upon this subject: after having tried for two or three days the medical and mechanical means recommended, without success, we must forbear and decide whether to trust the case to nature, with the hope of elimination of the invaginated bowel occurring, or to resort to gastrotomy. And in this decision, the circumstances of each case must be taken into account; for if the case has not yet progressed so far that adhesive inflammation has certainly taken place, and if we are able to detect the exact seat of constriction by the presence of a tumor, the operation certainly has strong arguments in its favor, and should not be hastily rejected.

In those cases which have been trusted to nature, and when elimination has fortunately occurred, we must treat the child, during this crisis, with the utmost care. The diet must be rigidly regulated, and the child kept in absolute repose. Nor must we relax these precautions for several weeks, and allow either indigestible food, or too large a meal of even the most digestible articles; since death has been several times known to follow this imprudence, from a rupture of the imperfectly formed cicatrix.

CLASS IV.

DISEASES OF THE NERVOUS SYSTEM.

GENERAL REMARKS.

It is a very common opinion, both in and out of the medical p
sion, that this class of diseases occasions a much larger num
deaths in childhood than any other. Indeed, many persons su
that, be the primary disease what it may, nearly all children wh
die, as it is said, by the brain. It appears, however, from an exa
tion of the bills of mortality for this city, that this opinion is no
founded. During the five years from 1844 to 1848 inclusive, the
ber of deaths from diseases of the nervous system was less than
diseases of the digestive system, and though larger than those
diseases of the respiratory organs, not so much so as the po
notion would seem to warrant. The number of deaths from di
of the nervous system was 3970; from diseases of the digestive sy
4204; and from affections of the respiratory system, 3376. M. Ba
whose observations were made at the Children's Hospital in Paris
(*loc. cit.*, t. i, p. 35) that, setting aside cases in which the nervous
toms were probably only sympathetic of some other coinciden
ease, the cerebro-spinal affections were few in number in comp
with those of the thorax, abdomen, and senses, including among
latter the eruptive fevers. He states (*loc. cit.*, p. 34) that affecti
the thorax constituted two-fifths of all the cases of disease, those
abdomen and senses each one-fifth, and of the nervous centres
tenth. M. Barrier, after combating the opinion so generally
tained, that disorders of the nervous system cause the death
greater part of the subjects who die before puberty, says (*loc. cit.*
p. 233) that there is only one circumstance that in part justifie
opinion, which he opposes "not as false, but as exaggerated," an
is, that the affections alluded to are almost always of a dang
character, that they are beyond the resources of art, and that
furnish a very considerable relative mortality. He says that, a
ing to his experience, the mortality in diseases of the cerebro-
system has been as sixty-eight in a hundred, while in those
thorax, senses (including the skin), and abdomen, it was respec
as forty-eight, forty, and thirty-two in a hundred.

Before beginning the consideration of the particular diseases
class, we are desirous of stating that we shall be compelled, on a
of our limited space, to devote attention chiefly to those which are
important from their frequency or severity, avoiding or merely

xistence of positive and definite tissue-changes in many diseases
ously regarded as purely functional.

ARTICLE I.

TUBERCULAR MENINGITIS.

finition; Synonyms; Frequency.—This disease is characterized
olent cerebral symptoms, dependent upon the existence of tuber-
granulations in the pia mater, as the essential anatomical lesion;
npanied, in the great majority of cases, by coincident inflammation
t membrane, by softening of the central parts of the brain, by ef-
s of serum into the ventricles, and in many instances by tubercu-
posits in other organs. Formerly tubercular meningitis, simple
meningitis independent of tuberculization, and simple dropsical
on within the cavity of the cranium independent of inflammation,
confounded together under the single term of acute hydrocephalus
ter on the brain. It has been shown, however, that a large ma-
of the cases of acute hydrocephalus of authors are, in fact, cases
bercular meningitis, and more recent researches have further shown
most of the remaining cases are in reality due to the altered con-
n of the blood, called uræmia, and are independent either of any
rial lesion of the brain or of the presence of an excess of serous fluid
cavities.

e term acute hydrocephalus ought to be therefore restricted to
single condition of sudden serous effusion in or around the brain,
pendent of any inflammation; a condition which only occurs in
ection with the causes of general dropsy, and especially with renal

s been observed particularly after measles and other fevers, and
ie suppression of eruptions.

larrier (*op. cit.*, t. ii, p. 379) explains, and we think with good
f reason, the causes of the disposition on the part of the tuber-
iathesis in children to localize itself in the brain, as well as the
ortionate violence and extent of the inflammatory action in com-
with the degree of the tubercular lesion, by the physiological
ons of the nervous system in early life, which are those of great
nal energy and nutritive activity.

the *exciting causes*, nothing positive is known. The disease has
ipposed to be brought into action by falls and blows upon the
y violent moral emotions, and by exposure to the sun. These
however, are all of doubtful influence.

TOMICAL LESIONS.—The tubercles which constitute the essential
ical element of the disease are very rarely found upon the free
of the arachnoid, but almost invariably beneath that tissue, or
meshes of the pia mater. They usually appear as more or less
gray granulations, the so-called *miliary tubercles*, and may gen-
be seen through the arachnoid, scattered about in the shape of
rounded, or flattened bodies, of grayish or yellowish-gray color,
rying in size from two-fifths to four-fifths of a line. When the
is passed over the arachnoid above them, they may be usually
little granular bodies. Their size, however, varies very much,
ey are in some cases so small and so closely resemble in color
rounding parts, that it requires a careful search to detect them.
ary also greatly in number, being in some cases thickly scattered
considerable extent of the pia mater, while in other cases but
three can be discovered on each hemisphere.

uently they can be detected with most ease upon the processes
mater which dip down between the convolutions, so that if we
find any granulations upon the surface, we should always strip
pia mater and carefully examine these processes. Upon a care-
amination of the arrangement of the miliary tubercles, it will
be observed that they are clustered about the small arterioles of
mater, and evidently follow in their distribution the branches
se vessels.

se granulations are not found upon all portions of the brain
y in cases of tubercular meningitis. On the contrary, they are
present upon its convexity or lateral aspects, while they are uni-
present at the base, and especially about the optic chiasm and
sures of Sylvius.

n *microscopic examination* of one of these granulations, its tissue
to be composed of numerous oval cells, with a single nucleus,
there are also some larger cells mixed with these which contain
l nuclei. In many instances, as has been observed by Cornil,[1]

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[1] Arch. de Phys. Norm. et Path., 1868, p. 98.

Hayem,[1] Bastian,[2] and ourselves,[3] the tuberculous granulation wi seen to envelop a small arteriole, whose calibre is obstructed at point of its development. There is also marked proliferation of cells of the peri-vascular sheath of the vessel for a varying distanc either side of the granulation, and it is highly probable that it is f these cells that the granulation has been developed.

We think it probable that some of the granulations may also be veloped from the cells of the connective tissue, which holds toget the vessels of the pia mater.

These miliary tubercles precede the occurrence of the inflammat changes in the meninges described below, and sometimes it happens very acute cases, that the only lesions discoverable consist of a gray granulations scattered in the meshes of the pia mater. It is probable, however, that they exist any great length of time with giving rise to meningitis, since they are usually found associated w more or less abundant inflammatory exudation, which surrounds often conceals them. The chief seat of this inflammation, as of tubercular deposition, is the pia mater; the arachnoid membrane bei as a general rule, affected only to a slight extent. That membr sometimes, however, contains a very small quantity of clear or tur serum in its cavity. Its surface is often dry and viscid, and in so instances its whole tissue is opaque and thickened. But it is chie in the pia mater that are found the evidences of severe inflammati In order to detect these changes, it is necessary to examine the me brane not merely upon the surface of the brain, but to tear it off, so to bring into view the portions which dip in between the convolutio and which often exhibit the greatest amount of morbid alteration. T inflammatory lesions vary between mere vascular injection, infiltrati with clear, turbid, or gelatinous liquid, and abundant formation lymph. When the inflammation has gone beyond mere sanguine inj tion, it is marked by infiltration of the membrane with turbid, wh ish, or sanguinolent serum, with pus, or with whitish or yellow lymph. These products are, like the tubercular granulations whi they imbed and often conceal, most abundant at the base of the bra about the peduncles of the cerebrum, the optic chiasm, and in the f sures of Sylvius. In this respect the disease differs from simple me ingitis, in which the results of inflammation are usually more abunda and well marked upon the convexity than at the base. The pia mate which, in a healthy brain, can be readily detached from the surface that organ, becomes, in cases of meningitis, particularly in those whi are violent, more or less adherent, so that in tearing it off portio of the cineritious substance, which is itself softened, come with it. T proper tissue of the membrane is thickened and indurated, the degr of thickening depending on the amount of infiltration.

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[1] Etudes sur les Diverses Formes d'Éncephalite, Paris, 1869.

[2] Edin. Medical Journal, 1867, p. 875.

[3] Trans. of Biological and Micros. Section of Acad. of Nat. Sci. of Phila., 18

s very variable; sometimes there are only a few drops or
l, while in other instances it amounts to three ounces and
uch more. It may be so large as greatly to distend the
upture the soft commissure of the thalami, and even the
dum, diminish considerably the thickness of the hemi-
flatten the convolutions against each other. In such cases
luid passes through the membrane of the ventricle and in-
and softens the substance of the brain, so that the latter
nost of the consistence of thick cream. The characters of
y in different cases. It is white, perfectly limpid and trans-
ay be turbid, either from being secreted in that condition
ling in suspension albuminous or purulent flocculi, or por-
broken-down walls of the cavity. In some rare instances
nguiolent. Rilliet and Barthez remark that the effusion
ides with tubercular meningitis is different from that which
s tubercles of the substance of the brain. In the former it
rapidly, is turbid, exists in smaller quantity, and consti-
ndition formerly called acute hydrocephalus. In the latter
d slowly and in considerable quantity, dilates the walls of
, and constitutes one form of chronic hydrocephalus.
n itself presents various morbid alterations. The whole
seems enlarged, so that the dura mater appears distended,
he latter is cut into, the cerebral substance protrudes in the
ernia. At the same time the convolutions are observed to
against each other, and the anfractuosities seem to have dis-
The compression of the brain depends either upon the dis-
ion of the ventricular effusion, or upon sanguine turgescence
n. In most cases, but not in all, there is evident congestion
bral substance, shown by a more or less abundant dotted
d sometimes by a general rosy tint of the medullary, and
ess of the cortical portion. Softening of the substance of

SYMPTOMS; COURSE; DURATION.—The disease has been divided by authors into different stages, founded on the predominance of certain symptoms at particular periods of its course.

These divisions are all imperfect and unsatisfactory, because the disease is in fact a continuous one, and for this reason some writers have avoided attempting any classification of the symptoms. We can, however, obtain a more faithful picture of the disorder by adopting the division made by M. Valleix, which, though arbitrary and imperfect, because of the want of a natural line of demarcation, seems warranted by the very great differences in the character of the symptoms at an early and late period of the affection. We shall therefore describe first the invasion of the malady, and then two stages or periods of the symptoms after the disease is confirmed.

The *invasion* of the disease may be either insidious or sudden. In a large majority of the cases, the onset is preceded by a well-marked prodromic period. The length of this period varies greatly in different subjects. Its duration is stated by MM. Rilliet and Barthez to be, as a general rule, between fifteen days and three months, scarcely ever less, and rarely more. During this period, the symptoms presented by the child are those which are usually held to be indicative of a failure in the general health. The nutritive functions especially show disorder. The appetite diminishes, or becomes capricious, there are alternations of constipation and diarrhœa, the body grows thin, the color pales, the gayety of childhood disappears, and the patient becomes listless, apathetic, and complains of being tired and weak; or he is irritable and peevish, or too mild and gentle; study and exercise both become distasteful, and there is a degree of weakness and debility which, though slight at first, becomes at length so evident as to arouse the attention of the parents, or those who have charge of the child. Besides these symptoms, there is often very great restlessness at night. The only pain complained of is headache, and sometimes abdominal pain. The headache is, in subjects old enough to notice and describe their sensations, often a prominent symptom. It is not constant, but occurs at intervals, and is sometimes severe, and its returns frequent. Fever is not generally present until after the more positive symptoms have fairly begun, and when present is generally slight and fugacious. The emaciation and loss of strength are seldom present to such a degree, in the prodromic stage, as to confine the child to the house. On the contrary, he continues to amuse himself at times, and to walk as usual.

The following is a rapid and summary account of the mode of invasion in some of the cases that have come under our own observation:

In one case, in a girl six years of age, the invasion was preceded during three months by occasional cough, and irregular attacks of fever, by progressive emaciation, paleness, languor alternating with reme irritability, disinclination to take exercise, and during the ler part of the time by partial lameness, and in fact by all the signs general tubercular disease. In another, which occurred in a boy eight years of age, it was preceded for several months by frequent complaints of intense headache, especially after taking active exercise, ns of it spontaneously. In the case of a girl seven years old, whom saw, it was so severe that she cried frequently and bitterly, begged nave the doctor sent for, and submitted willingly to any remedy gested with a view to its relief. It is thought that the acute, shrill of the disease, to which the term hydrencephalic has been applied, ends on the acuteness of this pain. It usually lasts throughout the stage, and ceases only as the delirium and coma of the second ge come on. *Vomiting* is also a nearly constant symptom. Of 80 s collected from different sources by M. Barrier, it was absent only 5, or less than a fifth. This symptom generally makes its appear- e on the first day, rarely later than the second or third, and lasts or three days, and sometimes longer. In one case that we saw, it ed eleven days, though it was but slight on the tenth and eleventh. matters ejected from the stomach consist of the ingesta, and of mucus bile in various proportions. It is commonly repeated two or three es a day. *Constipation* is even more important as a symptom than one last named. Of 87 cases it was absent only in 7, according to rier. MM. Rilliet and Barthez state, however, that it exists at the inning only in about three-fourths of the cases. Where there is rhœa instead of constipation, at the invasion, as sometimes happens, former symptom almost always depends on tubercular disease of intestine. Even under these circumstances, however, the diarrhœa metimes arrested, and constipation substituted under the influence he cerebral disease. The constipation generally persists obstinately several days, and then gives way under the influence of purgative lication, or is replaced spontaneously by diarrhœa with involuntary ls towards the termination of the case.

n connection with the three important symptoms just described, re are others, which, though less characteristic, are of much assist- in forming the diagnosis. The child is *dull* and *sad*, or *excited* and *able* by turns; he shuns the *light*, or closes the eyelids and contracts brows when it is thrown upon the face; his hearing becomes pain- y acute, so that sudden and jarring sounds distress and irritate him; *sleep* is restless and disturbed, and accompanied by grinding of the h; and he utters from time to time, both sleeping and waking, the uliar shrill, sharp, and sudden scream, which seems to depend upon rnal pain, probably headache, and which has been called by Coin- the *hydrencephalic cry*. In young children, those who have not yet ned to put their sensations into words, a peculiar, apparently cause- obstinate peevishness and positive ill-temper, shown by sudden, p crying at any disturbance, as even the kindness of a father or her, especially when this alternates with sluggishness or drowsi- , and when there is no evident disease of a painful or exhausting to explain such a state, ought to arouse the fears of the physician the possible inception of this disease, even when there is as yet no iting or distinct signs of headache to call attention to the brain. general as well as the special sensibility is sometimes but not by means always, exaggerated at this time. Rilliet and Barthez met exaltation of this function only in four of their patients. The

d with every symptom of tubercular disease of the brain.
disorders of intelligence do not occur in the early days of the
they usually make their appearance about or soon after the fifth

g the first stage the *coloration* of the face ought to be noticed.
erally paler than natural, though from time to time a sudden
redness may be seen to pass over it. The condition of the *senses*
al, except that the acuteness of the eye, ear, and sometimes that
, are exalted, so that the child avoids the light, starts at sudden
sounds, and cries when it is touched or moved. The *respira-*
omes unequal and irregular, and is interrupted by sighing or
g.

lsions rarely occur in the first stage. MM. Rilliet and Barthez
e that meningitis without complication of tuberculous disease
erebral substance, never begins with convulsions. In one of the
at came under our charge, a severe and prolonged convulsive
did occur, however, on the very first day of the attack of the
The subject of the case was a boy between four and five years
he death took place on the eighteenth day, and the autopsy
no tubercular disease of the cerebral substance. It is proper
, however, that the child had eaten on the morning of the day
was attacked, a most unwholesome meal, and it is very possible,
fact supposed at the time, that the convulsions were caused
presence in the stomach of undigested food. When they do
tubercular meningitis, they may be limited to the extremities,
ip, eyeballs, or they may be general. Sometimes the child dies
nvulsion. They are generally much less important as a symp-
cording to M. Valleix, than in simple acute meningitis.

tongue remains moist; the *appetite* is not entirely lost; *thirst* is
te; the *constipation* continues, unless removed by treatment; the
n becomes *retracted*, so that its walls approach closely to the

sseau refers to it as a red line or spot remaining upon the skin of
orehead or abdomen when the finger has been drawn across it, and
given to it the name of "*tache méningitique*," or "*tache cérébrale.*"
had often remarked, before knowing that M. Trousseau had drawn
ntion to this phenomenon, that the slightest pressure with the finger
any part of the face or forehead, caused the appearance at the point
ressure, of a spot of a peculiar pink or rose color, which, like the
h above referred to, began faintly, became more or less deep in tint,
ained a few moments, and then as gradually faded away. This is
doubt one of the diagnostic symptoms of the disease. We do not
ollect to have seen it in any other disease, except once in a severe
e of typhus fever in an adult, in whom it was exceedingly marked.
this disease we believe it may always or nearly always be detected.
asionally contractions pass over the features, giving rise to grimaces,
er which the countenance resumes its expression of indifference and
por. The eyelids are generally only partially closed, and between
em the globes of the eyes can be seen to oscillate and move in various
ections, as though by some automatic force.

As the case progresses, the *nervous symptoms* become more and more
rked; somnolence gradually deepens into coma; the delirium be-
mes less and less frequent; and the child no longer observes what is
ing on, nor answers questions. As the somnolence and coma increase,
rious lesions of motility make their appearance, consisting, in order
frequency, of paralysis, which is generally partial; contraction with
idity of the limbs; stiffness of the muscles of the back of the neck,
using retraction of the head; stiffness of the trunk; spasmodic closure
the jaws; carphologia; subsultus tendinum, and convulsions. The
ralysis is almost always partial and of very limited extent, affecting,
instance, the jaw, the orbicularis muscles of the eyelids, the levator
the upper eyelid, the tongue, or one side of the face. It is very rare
see one of the limbs paralyzed. Contraction with rigidity of the
scles is an important symptom, but is not always present. When it
ists it generally appears at an advanced period of the attack, com-
only between the seventh and thirteenth days, and is usually partial.
may affect either the extremities, back of the neck, trunk, or inferior
axilla. It is seldom permanent, but after lasting one or two days,
sappears, to reappear at a later period. The carphologia, subsultus,
d chewing motion of the under jaw generally occur only a few days
fore death, and last but a few days.

The *decubitus*, in the early part of the second stage, is generally lat-
al, with the thighs flexed upon the pelvis, the legs upon the thighs,
e arms applied against the thorax, the elbows bent, and the hands
aced in front, the decubitus called by the French "*en chien de fusil*,"
gun-hammer. At this time the child will still occasionally move its
sition with facility, showing that strength is not by any means en-
ely lost. At a still later period the decubitus is dorsal. In the latter
rt of the first and early part of the second stage, the *pulse*, which we
ve ascertained to be accelerated at the invasion, falls to the natural
ndard, or becomes slow, and at the same time irregular. From 110

or 120, as it was, it now sinks to 90, 80, 60, or, as happened in one i stance to M. Guersant, to 48 in the minute. Coincidently with th change it almost always becomes irregular. The irregularity affec both its force and frequency, so that a strong pulsation may be follow by a feeble one, or the rhythm may be regularly or irregularly intermi tent. The irregularity varies greatly at different periods of the day, or within short spaces of time, so that the pulse is found to be very slow at one moment and much more frequent the next. On this ac count it is necessary to examine it on different occasions. Slownes and irregularity of the circulation are important as a means of diagnosis, since it has very rarely been met with as a permanent condition, except in the tuberculo-inflammatory affections of the brain and its appendages. Towards the termination of the disease, generally speakin two or three days before death, the pulse rises again in frequency, s that it counts at first 112 or 120, and gradually increases to 140, 160, o even 200 the day before, or that on which death takes place. Simultaneously with this change it also becomes extremely feeble and small, and often ceases to be perceptible at the wrist on the last day. Th *heat* of skin, which has fallen with the reduction in the frequency of th pulse, generally increases with its acceleration. This is not invariabl however, since in some cases the temperature remains but moderatel elevated, about 101° or 102°, until death; and in others an algid condi tion precedes death, in which the temperature falls as low as 79.4 (*Reynolds's Syst. of Medicine*, vol. ii, p. 379, art. Tuberc. Meningitis On the other hand, in some cases the temperature increases irregularl as the fatal result approaches, and may attain an extreme height. Thu Roger (op. cit., p. 323) has observed on the day of death in an attack of tubercular meningitis, a temperature of 108.5° F. During the las few days the surface is often covered with an abundant perspiration the tongue becomes dry; the teeth and gums are fuliginous; the exhaustion increases; the respiration becomes stertorous, unequal, difficult, and anxious, and at the very last attended with great dyspnœa; and the urine and stools are discharged involuntarily. Death finally occurs in this condition, or is hastened by an attack of convulsions. In some cases it is most lingering. In one instance we expected the death of a young child in this disease every day for eight in succession.

The *duration* of tubercular meningitis is exceedingly variable in dif ferent cases. As a general rule it lasts between eleven and twent days, though it may continue a considerably longer time. Rilliet an Barthez have never known death to occur before the seventh day.

DIAGNOSIS.—The diseases with which tuberculosis of the mening is most likely to be confounded are simple meningitis and typhoi fever. It might also be confounded, though this is much less probabl with the cerebral symptoms which complicate the exanthemata an some local diseases, especially pneumonia, and to which symptoms, a group, M. Barrier has applied the term pseudo-meningitis.

The diagnosis between tubercular and simple meningitis will be be understood from the following synoptical table, extracted from the la edition of the work of MM. Rilliet and Barthez.

LE ACUTE MENINGITIS.	REGULAR TUBERCULAR MENINGITIS.
ubjects of acute simple menin- usually robust and well-devel- present no trace of either in- external tubercular disease. ealthy parents.	I. Subjects of tubercular meningitis delicate, puny, exhibiting often precocious intelligence and sensibility. Have sometimes had, in infancy, enlarged glands or chronic cutaneous eruptions; the parents, or brothers and sisters, often present the signs of tubercular disease.
disease may prevail epidemi-	II. Disease always sporadic.
ndition prior to invasion.—The gins in the midst of the most health, or, if secondary, it oc- he course of, or during the con- e from, some acute non-tubercu- e, or it follows an external cause.	III. *Condition prior to invasion.*—For some months or weeks the patients grow languid, lose their strength, become pale, emaciate; their temper changes, they are dull, they lose appetite, the digestion is deranged, &c. Absence of prodromic symptoms is rare.
ode of invasion.—Violent con- attended with intense febrile t, and with very hurried respi- young infants; or very acute eadache, accompanied by fever, miting, and towards the end of or in the course of the second he latest, excessive restlessness, or not by somnolence; most vio- ium; formidable ataxia.	IV. *Mode of invasion.*—Never with convulsions at the onset; the change from the prodromic to the acute stage sometimes imperceptible. It takes place by a progressive increase of the symptoms before mentioned, and by the setting in of headache; in other cases, the acute stage is better marked by headache, vomiting, and constipation; generally, the intelligence remains clear; no ataxia. In the rare cases in which there is ataxia at the onset of the acute symptoms, the prodromic stage, above described, has been observable, or the meningitis has occurred in the course of advanced phthisis. In cases in which no prodromes exist, the meningitis begins with vomiting, constipation, moderate headache, and slight febrile movement; ataxia, if it is to appear, occurs later, and a mistake is impossible.
mptoms.—*Very intense* headache, vomiting, *moderate* constipation, ver, *high* delirium.	V. *Symptoms.*—Not *very intense* headache, vomiting *less frequent*, *very obstinate* constipation, *very moderate* fever, slowness and irregularity of the pulse, delirium usually mild.
rom the beginning, the aspect of disease of ataxic form.	VI. Invasion insidious, with the aspect of a mild disease.
Course rapid, aggravation pro- and continuous; convulsion after ion, or else violent delirium, ex- gitation, violent fever, &c.	VII. Course slow, preservation of the intelligence to an advanced period, fever slight, and some slowness and irregularity of the pulse, sighing, changing color of the face, eye dull or ecstatic, &c.
tion.—Disease of short duration, sometimes in 24 or 36 hours, but generally from three to six days, lom more.	*Duration.*—Always much longer in the regular form.

l disease, by accurate physical examination of all the important
s of the body.

oGNOSIS.—M. Barrier, in speaking of the prognosis of this affection,
: "The gravity of tubercular meningitis is not surpassed by that
y other disease. Thoracic and abdominal phthisis, though almost
tantly fatal, pursue a slower course, and last a longer time. We
even allow as proved, that in a small number of cases, they are
eptible of cure, or may remain stationary for months or years.
ortunately it is not so in regard to tubercular meningitis." MM.
iet and Barthez, in their second edition, do not express the same
re hopelessness as to recovery from the disease, that they did in
r first. They say, amongst other conclusions (*op. cit.*, t. iii, p. 510),
t there are on record incontestable examples of the complete dis-
earance of the symptoms, but remark, that such cures have oc-
red in the first stage, or in the first half of the second stage, after
en or eight days of sickness, rarely later, and after alternations of
lioration and aggravation. They state also that, in excessively rare
ances, a return to health has been obtained even in the course of
third stage, after many weeks of illness. They are of opinion that
disease often returns and proves fatal in from one to five years and
alf after the recovery. The cause of the relapse is to be found in
fact that the local lesion remains, and that the diathesis has not
n eradicated. M. Valleix is of opinion that after having acquired
conviction that a case is really one of tuberculosis of the meninges,
should regard the patient as lost; "for the exception that I have
ntioned (a case belonging to M. Rilliet, then unpublished), even did
doubt as to the exactness of the diagnosis remain, ought not, stand-
by itself, to impart to us any real security." M. Guersant (*Dict. de*
l. t. xix, p. 403), seems to think it possible that the disease may
netimes terminate favorably in the very early stage, but adds that
ich cases are always more or less doubtful, and seem to us to belong
her, for the most part, to simple meningitis." During the second
iod (that of slowness and irregularity of the pulse), he has scarcely
n one child in a hundred survive, and even then they perished at a
er period of the disease, or of phthisis pulmonalis. Of those arrived
the third stage (marked by renewed frequency of the pulse, coma,
d lesions of motility and sensibility), he has never seen any recovery,
en momentarily. Dr. George B. Wood (*Prac. of Med.*, vol. ii, p. 365),
tes that he has "never seen a well-marked case of tuberculous men-
gitis end favorably."

We shall quote but one more authority as to the prognosis of the
sease. Dr. Robert Whytt (*Works of Robert Whytt, published by his son,*
arto, Edinburgh, 1768, p. 745), says: "I freely own, that I have
ver been so lucky as to cure one patient who had those symptoms
hich with certainty denote this disease; and I suspect that those who
agine they have been more successful have mistaken another dis-
nper for this." Our own experience coincides with the mass of evi-
nce given above as to the almost hopeless fatality of the disease. All

er, and there, after having become quite stout and healthy during
ied of dysentery in April or May. The mother died in 1852, of
arge cavities in both lungs.

, in which the early symptoms of the disease were well marked, and in
took place, will be detailed in the remarks on prophylactic treatment.

seen but two other cases which gave us the least reason for
ve had once supposed the children attacked with the dis-
occurred in a boy eight years old, who had been suffering
ks before we saw him with violent frontal headache, fre-
ing, constipation, slight fever, and somnolence. We fully
at this would prove to be an attack of tubercular menin-
rge dose of calomel followed by castor oil, and free leeching
es, relieved him in two days perfectly, and he has remained
nce, though this was nearly twenty years ago.

d occurred in a boy also eight years of age, whose father
few years before of phthisis, the younger brother died of
meningitis, and the sister of hooping-cough, with the lungs
miliary tubercles, as ascertained by a post-mortem examina-
child, after having had fair health previously, was seized,
end of March, 1865, with frontal headache, very slight fever,
vomiting, constipation, hesitating pulse, languor, willingness
and a tendency to somnolence. He was treated with rest,
eef tea in alternate doses, and mustard foot-baths morning
g; the bowels were kept moderately open, and he took tinc-
chloride of iron in combination with dilute acetic acid and
the acetate of ammonia every three hours. Under this
he improved, and in ten days had quite recovered. The
t the time was tubercular meningitis in the early stage.
removed from this city to Washington, where he died on
June of the same year, after an illness of twenty-one days,
s called water on the brain.

er case to which one of us was called in consultation, a boy
her had died a few years before of diabetes mellitus, and
er's family was tuberculous, presented a series of symptoms
could explain only as the result of slow thickening of the
at the base of the brain, in all probability the result of a
deposit. This child had, for several weeks, violent frontal
constipation, loss of flesh, lassitude, a peculiar one-sided or
in walking, strabismus, and great impairment of vision, so
uld see a small object only by bringing it almost in contact
ce. There was scarcely any disturbance of the circulation,
ight febrile heat at night. He was treated at first with rest,
food, minute doses of bichloride of mercury in combination
of potassium, three times a day, and then when he began
, with tincture of the chloride of iron and cod-liver oil for a
. He finally recovered his health, grew stout and strong,
mained ever since so blind that he reads with great difficulty,
es to pick his way through a room or the street, with only

are, livid color of the face, sweats occurring about the face, expression of the eye, dry and incrusted nostrils, and especially rapid pulse, and the various nervous symptoms mentioned, as logia, subsultus tendinum, and general convulsions.

ATMENT.—In the early editions of this work we took the ground was proper in the early stage of the disease to employ blood- Further experience and knowledge compel us to retract this n. We believe now, that abstraction of blood should not be d to unless when the diagnosis between this disease and simple gitis is very uncertain. Where there are no marked signs of active mation, where, from the family history, from the absence of d fever, and the peculiar state of the pulse, we have every to believe that the low-typed inflammation present is the result presence of tubercle, we deem it safest to avoid all lowering res. The case is so critical, so almost hopeless from its very , that we prefer a treatment based on the theory of promoting a ression of the tuberculous deposit. The only measures which, experience of over thirty years, we have found to delay and, in ses referred to in the article on prognosis, to cure the disease in ave been the following: quiet of body and mind, obtained by of rest in or on the bed, in a pleasant room, with attendants ow how to soothe and still the child. We always insist upon a ous diet: and one consisting mainly of milk and cream, or the xed, with beef tea, bread and butter, if the patient will take it, t-toast, in moderate quantities every three or four hours, a soft- egg, or the yelk of a hard-boiled egg, once or twice a day, is ve usually endeavor to get the patient to take. A mustard th two or three times a day, is always safe, and we think useful nquillizing. The bowels should be moved gently once a day, or wo days, by means of an enema or some simple laxative, as syrup of rhubarb. Active purgation we have found of no use. edies, we prefer the following:

℞.—Tr. Ferri Chlorid.,	fʒj.
Acid. Acet. Dil.,	fʒj.
Liq. Ammon. Acetat.,	fʒij.
Syrup. Simp.,	f℥j.
Aquæ,	f℥ijss.—M.

A teaspoonful at five years of age, every three or four hours.

nnection with this, we give half a teaspoonful of cod-liver oil in n three times a day. Calomel we have abandoned of late years , as it has utterly failed in our hands to do any good.

has been very much employed as a remedy in this disease, the forms of Lugol's solution and iodide of potassium. Perhaps ngest argument which exists in its favor is the benefit which llows its employment in other scrofulous and tuberculous dis- hough there are several cases in which it is asserted to have ccessfully used in tubercular meningitis. Iodine itself is com- ely little used. M. Rilliet (*op. cit.*, t. iii, p. 308, 1847) states that

atment which has just been described is that which we have
y our convictions as to the nature of the disease, and by our xperience of different plans, to adopt as the most reasonable st. It is proper to state, however, that we have never seen other method, of any avail after the disease has passed into part of the second stage—when coma, dilatation of the pupils, rabismus, paralytic or convulsive phenomena, show the pres- flammatory exudation under the membranes, and of serous to the lateral ventricles, or the peculiar lesions of the sub- the brain, which exist at that period of the malady. It is r to add that other means have been recommended by high s, and to these we shall now devote some remarks.

irritation in different forms has been employed, and appar- success, though it has failed in our hands. Blisters to the ind the ears, or over the whole scalp, have been used. At in this city, it was a common practice to cover the scalp with but it was found to fail so constantly, and was so painful a e relations of the child, that it has been very much aban- urely, if it had succeeded in any considerable proportion of it would have been received as a boon, however revolting to We have, ourselves, in past years, blistered the nucha, the e ears, and the temples in a number of cases, but have always btain any evident good from them. Within a few years it claimed that pustulating the whole sinciput with croton oil f great service. The last case of tuberculous meningitis we red in an adult, and here we had nearly the whole of the he head shaved, and pustulated with the oil, but it was of no ver.

lications to the head have been very much used. We have them ourselves, and still use them whenever the head is hot, heir use relieves the headache or soothes the patient, but we

tion, of the least benefit in the disease. On the contrary, we can-
ut think that the violent irritation of the digestive mucous mem-
e which it has determined, whenever we have used it largely, and
nflamed, irritated condition of the mouth which it caused in one
must have been a serious aggravation of the state of disease under
h the constitution was laboring. Mercury is well known to be an
ious and dangerous remedy in the tubercular diseases of adults,
ng for its effect to increase the dyscrasia of the constitution, which
dy exists, and thereby to hasten the progress of the malady. Why
ould have a different effect in children is difficult to understand.
ay be said, to be sure, that in the disease we are considering, it is
n to overcome the inflammatory element of the malady, which, for
time, constitutes the danger of the case, and also to allow the patient
chance of its beneficial operation should the disease happen to be
of simple meningitis. In support of the views just expressed, we
quote the opinion of Dr. John Abercrombie (*Diseases of the Brain*
Spinal Cord, Philad. ed., 1831, p. 173–6): "Mercury has been
ngly recommended in that class of cases which terminates by hy-
ephalus, but its reputation seems to stand upon very doubtful
nds. In many cases, especially during the first or more active
e, the indiscriminate employment of mercury must be injurious. . . .
he preceding observations, I shall perhaps be considered as having
ched too little importance to mercury in the treatment of this class
iseases, particularly in the treatment of hydrocephalus; but in doing
I have stated simply what is the result of an extensive observa-
, . . . and I confess, the result of my observations is, that when
cury is useful in affections of the brain, it is chiefly as a purgative."

t has been recommended, within a few years, by Sir B. Brodie, to
loy mercurial inunction as especially applicable in using mercury
children. He advises that a drachm or more of the ointment be
ead upon one end of a flannel roller, which is to be applied, not very
tly, around the knee; repeating the application daily. "The mo-
s of the child produce the necessary friction; and the cuticle being
n, the mercury easily enters the system." The editors of the journal
which this communication is made (*Braith. Retrosp. of Med.*, vol. iv,
6, p. 147, from *Quart. Med. Rev.*, July, 1846, p. 169), state that they
d this plan in a case of acute hydrocephalus, in which some of the
st urgent and fatal symptoms were present, "such as very dilated
lls, constant convulsions, hemiplegia, and more or less stertorous
athing; in short, so violent were the symptoms, that we considered
ease perfectly hopeless; but on reflecting on Sir Benjamin's method,
ordered strong mercurial ointment to be smeared on each leg, every
lve hours, and covered with a stocking made to tie tightly above
knees. The symptoms soon began to abate, and by following this
with small doses of iodide of potass., frequently repeated (gr. i, every
ee or four hours), the head symptoms vanished.

In a second case, the same set of symptoms were approaching, but
re stopped by the same mode of treatment."

hen the convulsive symptoms are violent and distressing, they may

k preparations and bread, and of small quantities of light broths,
of meat very finely cut up. As the child grows older, the meals
ght to be arranged at regular hours, and should consist of four in
day. The principal food must be bread and milk, well-chosen, well-
ked meats, and rice and potatoes as almost the only vegetables.
ter the first dentition is completed, a moderate use of ripe and whole-
me fruits may be allowed, but always with care, in order to avoid in-
y to the digestive organs, and also so as not to mar the appetite for
re wholesome and nutritious food. Coffee and tea ought to be for-
lden at all times; since, as we have often observed, when the palate
a child is taught, by habit, to become accustomed to these more
ghly sapid substances, it is very apt to abandon the use of milk,
ich ought to constitute a large proportion of its food, at least up to
e age of twelve or fifteen years. In no circumstances of life is the
l saying, "where ignorance is bliss, 'tis folly to be wise," a better
le of action than in regard to the diet of our children. The child
ould not taste improper articles of food, so that it may escape the
rment of desiring what is improper.

After diet the most important points in the treatment are air and
thing. The child should inhabit, if possible, a large, dry, well-ven-
ated room, which ought to be kept as cool as possible in summer, and
derately warm in winter. Not a day should be allowed to pass, un-
s the weather is totally unfit, without the child's being sent for sev-
al hours into the open air, and we believe that it is much better for it to
lk than drive, unless the weather be very hot. The clothing ought
be suitable to the season, cool in summer and warm in winter. In
r country there is a great inclination to *harden* children by dressing
em very slightly in cold weather; so that they frequently suffer from
tarrh, pneumonia, and spasmodic croup brought on by improper ex-
sure. This cannot but be wrong in a child who shows the least evi-
nce of a tendency to tubercular affections.

For our own part we are fully convinced from what experience we
ve had of the diseases of children, that by far the most certain and
fectual means of preventing the development of a tubercular, or in-
ed any other cachexia in a child, is to have it brought up in the open
untry, or in some healthy village, until the epoch of puberty has
ssed by safely. A very good plan for parents whose occupations
mpel them to live in cities or large towns, is to have their residence
few miles in the country, and to come to town every day. Children
ought up in this way have a far better chance of obtaining strong
d vigorous constitutions, than those reared entirely in the close and
nfined dwellings and streets of crowded cities.

When a child, who, from the health of its parents, or from its own ap-
arance, may be suspected of having any tubercular or scrofulous taint
its system, becomes subject to frequent attacks of apparently cause-
ss headache, and especially when such headaches are associated with
constipated habit of body and with occasional vomiting, it ought to
looked upon as threatened with tubercular disease of the brain.
nder these circumstances we would advise, in addition to the meas-

ures just now recommended as to diet, dress, exercise in the ope
and a residence in the country, that it be put at once upon the u
cod-liver oil, iodide of iron, and mild laxatives, and that these be
severed in for several weeks or months, until in fact the strength
general health are restored and the headaches cease. When the
tite is poor, and the digestion is imperfect, in such a case we ma
with advantage, besides the above remedies, solution of pepsin, a
spoonful three times a day with the meals, or tincture of nux vo
three or four drops in a mixture of syrup and compound tinctu
gentian, or in a teaspoonful of elixir of cinchona three times a
If the child is of an age to be going on with its education, this sh
for the time cease, or be carried on in such a way as to avoid all ex
ment or fatigue. A case occurred to one of us in the course o
year 1852, which showed, we think, very clearly the utility of
measures.

A boy between seven and eight years old, whose mother had died of well-m
phthisis a few months before he was put under our charge, had been losing fle
strength, and suffering from occasional headache for some time before we were
to see him. We found him in bed complaining of severe frontal headache; so
at times, and usually in the after-part of the day, as to cause great distress
crying. The intelligence was perfectly natural. The child was rather dull an
less, from suffering and from weakness, but not from any want of a healthfu
of the mental operations. There was no sign whatever of spasmodic or pa
affection. In the morning the skin was cool and natural, but in the afternoon
came warm and dry, but not very hot. The pulse was 62 to 68, and though no
ally irregular, it was halting or hesitating. There was occasional, but not fre
unprovoked vomiting, and he complained often of sick stomach, even when
not vomit. The bowels were very much constipated, and had been a good deal
some weeks previous to his falling actually sick. There was no cough, no sore
and no soreness about the abdomen. The tongue was moist, soft, slightly furre
not red nor gashed. The urinary secretion was healthy. Physical exami
showed the lungs and heart to be without disease.

The treatment during the first week was small doses of calomel and rhubar
a grain of the former to two of the latter, given for a day, and followed by sy
rhubarb and fluid extract of senna, until the bowels were copiously evacuated.
this the bowels were kept soluble by the administration every day, or every
day, of doses of Seltzer powder, sufficient to produce the effect. Blisters were a
behind the ears. In the after-part of the day, when the head and body became
cooling applications were made to the head, and the feet were put into mustard-
once, twice, or three times. Two grains of iodide of potassium were ordere
given three times a day. The diet was to be light but nutritious. It was to
of bread and milk and a soft-boiled egg in the morning, oysters or light meat
rice for dinner, and milk with bread in the evening. Of these he was to hav
reasonable quantity that he might desire. Under this treatment he improved
with occasional drawbacks for a week, when the iodide of iron was substitut
the iodide of potassium. The bowels continued very costive, requiring daily
of the Seltzer powder; the headaches diminished in frequency, duration, and sev
the pulse went up to 72 and 78, and became more free and even; the appetite h
proved, but the child remained still very weak, pallid, and quite emaciated.
another week, as he continued to mend, and the stomach had become stronge
liver oil was ordered in addition to the iron; a teaspoonful was to be taken
times a day in a wineglassful of table-beer. As he gained strength, the amou

d of food was increased. He was, indeed, encouraged to eat heartily of plain and
stible substances.

e now improved gradually in health. The headaches subsided, and finally ceased;
bowels became soluble; the appetite grew hearty and strong, and all feeling of
sea disappeared; he regained his strength, flesh, and color, so that at the end of
o months we saw him looking quite fat and well. The iodide of iron and cod-
er oil were, however, to be continued for a month longer. He is now (1869) a
ung man in very good health. He has passed several years in Germany pursuing
cientific education, and has returned lately to this country, and is about to marry.

As to the particular means likely to be of service in preventing a
rection of the tubercular cachexia towards the brain, such as might
oduce tuberculosis of that organ, we have only to propose the course
commended by different writers, viz., to keep the head cool by not
owing it to be very warmly covered, and by keeping the hair short; to
ep the extremities warm; to avoid stimulating the intellectual facul-
s to any considerable extent by education, until after eight or ten
ars of age; and to use every means to preserve the general health in
ound and pure condition. Some recommend the long-continued em-
oyment of a powerful derivative from the brain, as a small blister on
e arm or a seton in the neck. We think, however, that such reme-
s ought not to be used unless there are positive symptoms of a tend-
cy to cerebral disorder. The caution not to interfere much by pow-
ful *local* applications, with eruptions which nature may have thrown
t upon the scalp, is, we believe, wise and prudent; though there can
no objection to the administration of suitable internal remedies with
view to their cure.

ARTICLE II.

SIMPLE MENINGITIS.

DEFINITION; SYNONYMS; FREQUENCY.—By this term is understood
flammation of the membranes of the brain, independent of tubercu-
sis of those tissues, or of other organs of the economy.

The disease was for a long time confounded with tubercular menin-
itis under the titles of water on the brain, dropsy of the brain, and
cute hydrocephalus. It has also been called arachnitis; and more
arely phrenitis.

Its frequency is much less than that of tubercular meningitis. West
p. *cit.*, 4th Amer. ed., p. 100), states that he has seen 7 cases of fatal
cute meningitis, in 5 of which post-mortem examination was made
nd confirmed the diagnosis. Vogel (*op. cit.*, p. 359) speaks of it as
eing much rarer than the tubercular form, and states that it is no
ore frequent in children than in adults. It appears that MM. Rilliet
nd Barthez, during their researches, met with only five cases of this
isease, while they report thirty-three of tubercular meningitis. Bou-

has taken place earlier in the disease. The pia mater is gener-
asily detached from the cerebral substance, particularly when the
termination has occurred early. The *substance* of the brain is firm,
ut slightly colored, in rapid cases. When the course of the dis-
has been slower, the cineritious portion is generally of a bright
color, and the medullary substance abundantly dotted with red,
ing that the inflammation has involved the superficial layer of
rain. In the latter class of cases the surface of the convolutions
ally softened, and the pia mater adherent. In very young chil-
the whole brain is sometimes soft.

e *ventricles* do not, as a general rule, contain transparent serum,
t at a very early age, when serous effusion takes place with great
y. They, often, however, contain one or two teaspoonfuls, and
more than one or two tablespoonfuls, of pus or purulent serum.
erous membrane of the ventricles and the plexus choroides ex-
signs of inflammation in some instances. They are of a bright red
uneven, rough, and very much softened, in children who die
; and pale, opaque, slightly thickened, and rough, in those who
a later period.

e central parts of the brain often retain their firmness, but are
times softer than natural, or even diffluent. This softening is par-
rly apt to exist in very young children, in connection with large
on into the ventricles; though it also occurs in those who are
, and in whom there is only slight effusion of pus or purulent
n. In the former case it is probably due to the macerating effect
e effusion, while in the latter it is more likely to be owing to in-
nation.

some cases, and especially those of the epidemic form of the dis-
the membranes of the spinal cord are found to present the same
nmatory appearances which have been described as existing in the

without inflammation of the lining membrane of the ventricles, bel exclusively to tuberculous children." (*Op. cit.*, t. iii, 1846, p. 408.)

This law cannot, however, be adopted without exception, since have already seen, when speaking of tubercular meningitis, that t are, in a large proportion of such cases, evidences of inflammatio the lining membrane of the ventricles.

SYMPTOMS.—The following account of the symptoms of the diseas taken chiefly from the paper of M. Rilliet. That author describes t forms of the affection, the *convulsive* and *phrenitic;* the former of wh is characterized by a predominance of convulsive phenomena, and latter by disorders of the intelligence.

The disease may also be idiopathic or secondary, simple or com cated, sporadic or epidemic.

The *convulsive form* generally occurs in children under two year age. The disease usually begins suddenly or after a restless ni with a violent and prolonged attack of *convulsions*, oftener general t partial, and is accompanied by violent *fever*, and sometimes by consid able quickness of *respiration*. The existence of *headache* cannot be certained at this early age. *Vomiting* is often absent, and the *bo* generally continue regular in this form, though they are someti constipated. After awhile the convulsions cease, and the child mains for the time in a state of quiet, somnolence, or coma, when t return with renewed violence. The returns of the convulsions ge ally take place at intervals of one or two hours or more. In the tervals between the crises the child is restless or drowsy, or in a s of partial *stupor*, attended with tremulous movements of the extre ties; there is *strabismus*, *contraction of the pupils*, *trismus*, and someti *hemiplegia*. The skin retains its warmth, the pulse is accelerat irregular, and unequal; the face is pale; the stools are spontaneou easily procured by remedies. It is unusual to see the child regain consciousness so as to recognize objects in the intervals between convulsions, or after the appearance of coma and other cerebral sy toms. Death occurs during coma or in a violent attack of convulsi This form seldom lasts more than four days.

Occasionally this form begins in a different manner. The con sions, though they still predominate, do not occur until later in disease, and the whole course of the affection is slower. Such c begin with a violent febrile movement, lasting several days, and companied by acceleration or unevenness of the respiration, or almost constant drowsiness, preceded or followed by agitation, scre ing, staring expression of the eyes, and dilatation of the pupils; vo ing and constipation are sometimes present, at others absent. Aft time, however, convulsions make their appearance, and the case lows the course already described. The duration of this form may the same as that of the first, or it may last about two weeks.

The *phrenitic form* of simple meningitis generally begins sudd with fever, which is sometimes preceded by a chill; the skin is w and dry, and the pulse, in idiopathic cases, full and accelerated.

ondary cases the pulse has been found slow and irregular; in all it
omes irregular, small and very rapid the day before death. Simul-
neously with the fever there is frontal headache, which is often so
olent as to draw cries from the child, and, according to M. Rilliet, is
ore severe than either in tubercular meningitis or typhoid fever. It
also more constant, and lasts generally one, two, or three days,
til the appearance of restlessness, delirium, or coma. At the same
me there is great sensibility to light and noise, and abundant vomit-
g of bilious matter. The latter symptom is one of the earliest; it
nerally ceases after a few days, but sometimes continues to the very
d. Constipation exists in some cases, but is much less constant and
ore easily overcome than in the tubercular disease. The appetite is
st, and the thirst very acute. The abdomen is flattened and retracted,
pecially towards the end, while in secondary cases of this form, and
very young children, it retains its usual shape.

About the end of the first day, generally, or, in rare instances, after
o or three days, appear various disorders of the intelligence. The
st symptom of this kind is observable in the expression of the face,
hich becomes a little wild or wandering, and sometimes grimacing.
on afterwards occur restlessness, which is sometimes extreme, and,
succession, delirium, somnolence, and later in the attack, coma. The
stlessness and somnolence often alternate early in the case, though
e former generally predominates and soon passes into delirium, which
usually violent. When in this condition the child seldom recognizes
y one, and either refuses to answer questions, or answers incoher-
tly. In connection with the disorders of intelligence there exist
so trismus, grinding of the teeth, subsultus tendinum, partial convul-
ve movements, stiffening of the extremities or trunk, retraction of
e head, strabismus, contraction first and then dilatation of the pupils,
d in some cases violent convulsions, followed by deep coma. Death
metimes occurs at this period. In other instances, the disease con-
nues longer, and other symptoms declare themselves. Vomiting gen-
rally ceases; constipation increases; the abdomen is retracted; head-
che is no longer complained of; the fever continues, but the pulse
ecomes irregular; the respiration is uneven and irregular, being some-
mes more and at other times less frequent than natural; the face is
istorted and extremely pale, or there may be a purple flush on the
heeks; the restlessness is excessive, and accompanied by subsultus,
arphologia, or partial convulsive movements; the delirium, at first so
iolent as to make it necessary sometimes to hold the child in bed,
ubsides into a state of coma and collapse, in which general sensibility
obtunded, and special sensibility extinguished; the respiration be-
omes stertorous, and at length asphyxia, coma, or a severe attack of
onvulsions terminates the scene.

The course of the disease is generally continuous. In very rare cases,
owever, occasional remissions occur, so that the child recovers its in-
elligence for a short time, and recognizes persons around. The dura-
ion has varied between a day and a half and nine days.

standard, and special sensibility remains undisturbed.

It is to be distinguished from sympathetic convulsions acters just described, aided by a reference to the disease have caused the attack of eclampsia, and which may be one tive fevers, enteritis, indigestion, pneumonia, or any other tion. In some instances, however, the distinction cannot be by attention to the progress of the attack.

The phrenitic form may be confounded with tubercular with congestion of the brain, or with the early stage of fevers. The distinction between it and tubercular menin ready been considered under the head of the latter disease

M. Rilliet is of opinion that it is sometimes impossible in state of knowledge upon these points, to distinguish with tween simple meningitis and cerebral congestion or hem encephalitis. In regard to congestion of the brain, he very important question, "Whether we ought to class as m dangerous cerebral symptoms, resembling exactly those the commencement of meningeal inflammation, and term idly by death or recovery?" He states that examination in these cases reveals neither pus nor false membranes in t or pia mater, but simple congestion of the brain and its He deems the solution of the question to be difficult, but i opinion that they ought not to be classed together. He g lowing table, which he thinks may assist in making the di

CONGESTION OF THE BRAIN—MODE OF INVASION.	MENINGITIS.
There occurs instantaneously profound stupor, absolute immobility and insensibility, with dilatation of the pupils; or else acute delirium, with difficulty of	In the phrenitic form t tom is generally headache noted in any of the cases o congestion). The alterat

oating upon the tongue, redness of the throat, elevated tempera-
d nasal respiration, which exist in the latter.

NOSIS.—The prognosis of simple meningitis is very grave, but
ess hopeless than in the tubercular form. M. Valleix is disposed
k that most of the recoveries reported by M. Guersant were
f sanguine congestion or effusion. M. Rilliet (*loc. cit.*), who has
the subject more carefully than any other observer, cites several
es of recovery, but states that death is much the most frequent
ation.

TMENT.—It must be evident, it seems to us, that but little de-
ce can or ought to be placed on any but prompt and powerful
gistic treatment. *Bloodletting*, therefore, *mercury*, *cold* applica-
the head, *purgatives*, *counter-irritants*, and the most rigid diet
o be employed from as early a period as possible, and in the
ergetic manner.

section ought always to be preferred to local bleeding, even in
ngest child, unless it is impossible to find a vein, or unless this
ntly too small to bleed well. When venesection cannot, from
son, be employed, blood should be freely drawn by means of
or cups. It is customary to apply the leeches to the temples
nd the ears. We may remark that MM. Rilliet and Barthez
o the application of leeches to the head, and propose that they
be placed rather about the anus or on the inferior extremities.
antity of blood to be drawn must depend upon the age and con-
n of the subject, and the violence of the attack, in some measure.
ld always, however, be large, as much or more, we think, than
ssary in any other of the acute affections of childhood. In a
wo years old, of good constitution, from two to four ounces
not be too much at first, and should the symptoms not moderate
r eight hours, as much more may be taken. Should these de-
ns of blood fail to produce a good effect upon the dangerous symp-

While the bleeding is being performed we should direct the pr
tion of means for the application of *cold* to the head, which cons
another most efficient remedy in inflammations of the brain a
membranes. These means may consist of a bladder containing
and pounded ice, which is perhaps the most convenient and pow
of cloths wrung out of iced or very cold water, to be constantly ren
of cold affusions upon the head, or lastly, of irrigation as recomm
by M. Guersant, and described in the article on tubercular menin
Purgatives ought to be employed so as to empty the bowels thoro
and produce a decided revulsion upon the intestinal mucous meml
but not in such quantity as to occasion inflammation of that t
which would be very apt to prove the case were the drastic subst
and large doses recommended by some writers used. The re
usually given and most highly recommended is *calomel*, which is c
for its sedative and alterative properties. About four grains m
exhibited alone, and followed in one, two, or three hours by cast
jalap, or infusion of senna and manna, sweetened with syrup of rh
These doses ought to be given until the bowels are freely move
is always useful to employ a strong purgative enema immediately
the bleeding, without waiting for the operation of the internal rem
After the purgative doses have been given, it is important to con
the mercury in smaller quantities, with the view of obtaining its sp
influence upon the inflammation. The doses may consist of fr
quarter of a grain to a grain every hour or two hours. Some w
also recommend very highly the use of mercurial inunction.
(*op. cit.*, p. 361) states that a mercurial treatment is decidedly effe
and adds that the only two children he has seen recover from th
ease, were treated exclusively with mercury, internally and exter

Counter-irritants are useful as adjuvants to the more powerful rem
already indicated. During the first day or two they should c
chiefly of sinapisms and mustard poultices, applied from time to
to the trunk and extremities. Authorities differ somewhat as t
effect of blisters, and as to the time at which they ought to be ap
M. Valleix (*op. cit.*, t. ix, p. 187), opposes their employment in
affection as often injurious and still more frequently useless. We
the advice given by Dr. Abercrombie, as to their employment, is
ably the most prudent. This is, not to apply them in the early
but to wait until the active symptoms of the disease have been sub
They may be applied to the head itself, to the nucha, or to the ext
ties. We believe that we have seen them most useful when appli
the neck and inside of the calves of the legs. Nevertheless, th
high authority in favor of their good effects when applied upo
head itself.

M. Rilliet (*loc. cit.*) recommends a vigorous revulsion upon the
when the disease has followed the suppression of an eruption. H
poses with this view the employment of pustulation by croton oi
relates a case of recovery which followed this treatment under a
unfavorable train of symptoms. To make use of it the head m

ARTICLE III.

CEREBRAL CONGESTION.

›elieve, from our personal observation and from the evidence of of the highest authorities on the diseases of children, that cere- ngestion is of rare occurrence as an idiopathic and distinct affec- early life. We think that the symptoms which are detailed in ticle, and which are by several writers, and especially by Dr. ttributed to congestion of the brain, are rather due in some cases excitement and undue rapidity of the circulation, and in others rritation of the brain, caused by the circulation through it of a itiated by the poison of some of the acute specific diseases. In nstances still, we think the attacks are more accurately included he title of eclampsia.

pport of these views we quote below the opinions of some of the referred to. MM. Rilliet and Barthez assert (1ère édit., t. i, p. at they have found in children dying of different diseases, and d presented no cerebral symptoms, congestion precisely similar t they found in others who had exhibited more or less danger- pathic or secondary nervous symptoms. "Some patients," they (*loc. cit.*, p. 650), "it is true, who presented us with examples ral hyperæmia, had had well-marked nervous symptoms. Thus e met with the anatomical characters of congestion in young who had perished with convulsions, in those whose sickness en accompanied by violent delirium, and in others who, in the bral congestion in a child by special and characteristic symptoms, a whether we ought as a consequence to prescribe a particular form treatment. We acknowledge, on our part, that we find it impossib to describe any symptoms peculiar to that condition, and consequent to formulate a treatment." In the article on convulsions (t. ii, p. 28 they state that in some of their patients they found no traces of co gestion, and add that eclampsia is sometimes (a well-known fact) co nected with an anæmic state of the brain. "What are we to conclu from these opposite facts, if it be not that congestion plays but a se ondary part in convulsions?" They coincide in opinion with th authors of the *Compendium*, who suppose that the congestion found i patients who have died with convulsive symptoms, is generally th effect and not the cause of the convulsions. They do not deny, how ever, that a sudden congestion of the brain may produce a convulsiv attack, and quote cases from other writers.

We believe it to be a very common opinion in this country that mo of the nervous symptoms (delirium, somnolence, coma, convulsions, &c which occur in the course of many of the diseases of childhood, depen chiefly upon a congested condition of the nervous centres, and man practitioners refer most of the cases of eclampsia of children to the sam cause. We are glad, therefore, to call the attention of the professio to this point, and to place before it the opinions of some of the rece distinguished authorities in regard to it.

The authors of the *Bibliothèque du Méd. Prat.* are of opinion that it i very rare to meet with true pathological and idiopathic congestion o the brain, either in the first or second infancy (t. vi, p. 118). M. Bar rier states that primary or secondary hyperæmias are sometimes cause of convulsions, and that such cases are the most dangerous o their kind. He also states that in rare instances congestion assumes a more menacing character, similar to that which is more frequently me with at an advanced age, meaning the apoplectic form. M. Vallei asserts (*op. cit.*, t. ix, p. 259) that "cerebral congestion is a diseas almost unknown in infancy."

M. Rilliet, in the paper on simple meningitis quoted in the articl on that disease, states, as his opinion, that the cases attended wit dangerous cerebral symptoms, which resemble exactly those occur ring at the commencement of meningeal inflammation, which termi nate rapidly in death or recovery, and in which the only lesions found after death are congestion of the brain and its membranes, ought to b regarded as dependent upon congestion, though he thinks it difficult to determine positively whether they are in fact the result of that con dition, or whether they are not merely the forming stage of meningitis

Dr. Charles West, of London, whose publications upon the diseases o children are amongst the most valuable that the English press ha afforded us, treats of congestion of the brain in children as a very im portant and frequent condition of disease. We shall chiefly follow him in our remarks upon this subject, although we have no doubt, from ou own observation and from the researches of the French observers abov ed, that its importance has been much exaggerated, and that its influence in the production of the symptoms generally ascribed to very imperfectly understood.

r. West treats of congestion of the brain under two heads, as *active passive.* By the former is meant the kind of congestion occurring ler the influence of a cause which greatly increases the flow of blood the head, and to this class belong, for instance, the head symptoms ich often usher in the eruptive fevers; by the latter is understood kind depending on an impediment to the reflux of blood from the in, to which belong, for example, the convulsions which occur in a of hooping-cough.

ctive congestions may occur during the process of dentition, or y result from exposure to the sun, or from blows upon the head; sive congestion may be the result of a mechanical impediment to return of blood from the brain, as the pressure of an enlarged thys, or it may be the result of enlarged and tuberculous cervical or nchial glands pressing upon the jugular veins, or of languid circulan depending upon want of pure air, or of nourishing and sufficient d. Dr. West states that intense cerebral congestion is not a very sual consequence of the disturbance of the circulation at the outset the eruptive fevers. He says that convulsions and apoplectic sympns sometimes come on suddenly in these cases, and may terminate ally in less than twenty-four hours; after death "the brain is found ded with blood, but all the other organs of the body are quite lthy." We would merely remark here, that it seems to us very btful whether the nervous symptoms just alluded to, ought not to regarded as the result of the presence in the nervous centres of a eased and vitiated blood, rather than of congestion. That congesn does not always produce them is shown by the statement of MM. liet and Barthez (*op. cit.,* t. ii, p. 620), in regard to the cerebral sympns of scarlet fever, "that a more or less marked sanguine congestion the cerebro-spinal apparatus) is the only alteration *generally but not ays* found; and sometimes the congestion is not more marked than other diseases in which there had been no cerebral symptoms." th these remarks we shall pass on to the consideration of the sympns generally ascribed to congestion occurring under other circumnces, as those taking place in the course of the eruptive fevers will treated of under the head of those affections.

Dr. West states that cerebral congestion may come on suddenly with ry alarming symptoms, or it may be preceded for a few days by genal uneasiness, by a disordered state of the bowels, generally but not ays consisting of constipation, and by peevishness. "The head by grees becomes hot, the child grows restless and fretful, and seems tressed by light or noise, or sudden motion, and children who are l enough sometimes complain of their head." Vomiting generally curs repeatedly, sometimes before any other symptoms, and is a very portant sign. The fever varies greatly as to its violence, though the lse is usually much and permanently quickened, and if the skull be still unossified, the anterior fontanelle is either tense and prominent, or the brain is felt and seen to pulsate forcibly through it. The sleep is disturbed, the child often waking with a start, and there is often occasional twitching of the muscles of the face or the tendons of the wrist.

The child, Dr. West remarks, may recover from these symptoms without any medical interference, or the case may become aggravated and terminate in acute hydrocephalus; or again, the congestion may increase and cause the following symptoms. Under the latter condition, "the countenance becomes heavy and anxious, the indifference to surrounding objects increases, and the child lies in a state of torpor or drowsiness, from which, however, it can at first be roused to complete consciousness." The bowels generally continue constipated, and the vomiting seldom ceases, though it may be less frequent. The pulse is usually smaller than before, and often irregular in its frequency, though not intermittent. "An attack of convulsions sometimes marks the transition from the first to the second stage; or the child passes, without any apparent cause, from its previous torpor into a state of convulsions, which subsiding, leaves the torpor deeper than before. The fits return, and death may take place in one of them, or the torpor growing more profound after each convulsive seizure, the child at length dies comatose."

This second stage is usually of short duration, as death generally occurs, unless relief be afforded by appropriate treatment, within forty-eight hours from the first fit, "though no graver lesion may be discovered afterwards than a gorged state of the vessels of the brain and its membranes, and perhaps a little clear fluid in the ventricles and below the arachnoid." Occasionally, however, recovery takes place, contrary to all expectation, after these symptoms have continued but slightly modified, for days or even weeks.

Acute congestion is to be *treated* like simple meningitis, with blood-letting, cathartics, calomel, cold applications to the head, baths, revulsives, low diet, and confinement to a cool, dark chamber. It is useless to repeat here, what has already been said in our remarks upon the treatment of meningitis.

In passive congestion the treatment should consist, according to Dr. West, of careful local depletion, if the case will bear it, and in strict attention to the diet and state of the bowels. He recommends mercury and chalk, to correct the bowels when they are out of order. If the case be associated with diarrhœa and bad nutrition, he recommends that extract of bark, with a few drops of sal volatile, or of the compound tincture of bark, be given two or three times a day. Farinaceous food, he remarks, is not usually well digested when nutrition is much impaired, and he recommends milk and water, or milk and water with light meat broths.

ARTICLE IV.

CEREBRAL HEMORRHAGE.

We shall consider hemorrhage of the brain under two heads, that of e substance, and that of the membranes; the former is usually desig- ated as cerebral, and the latter as meningeal apoplexy. Both these rms of hemorrhage are of rare occurrence in childhood compared ith other diseases of the brain, and with their frequency during adult e and old age. Of the two kinds, that of the meninges is the most ommon.

Definition; Frequency; Forms.—By cerebral apoplexy or hemor- age is understood an effusion of blood into the substance of the rain. By meningeal apoplexy or hemorrhage is understood an effusion f blood between the dura mater and cranium, into the cavity of the rachnoid membrane, beneath the arachnoid, or in the meshes of he pia mater. Cerebral hemorrhage is a very rare affection in child- ood. This is proved to be the case by the facts that MM. Rilliet and arthez met with only eight cases in their extensive experience, and hat M. Barrier saw but one in 576 cases of disease of all kinds. Men- geal apoplexy is of more frequent occurrence, since MM. Rilliet and arthez report eighteen cases. M. Barrier met with one case of this rm in the 576 cases referred to. Dr. West (*London Med. Gaz.*, June 8th, 1847, p. 1062) says he has only twice met with distinct extrava- ation of blood into the substance of the brain in children.

Hemorrhage into the substance of the brain occurs in two different orms: one in which the effused blood is contained in a cavity caused y a laceration of the tissue of the organ, and designated apoplexy in cavity; and the other in which the blood is effused in a multitude of ttle points of different sizes, and designated capillary apoplexy.

In meningeal hemorrhage the blood may, as we have stated, be effused etween the dura mater and the bone. This form, however, is very are, so rare, indeed, that several writers deny its existence. It is roved, however, to have occurred, by a case reported by MM. Rilliet nd Barthez, which is the only one they have met with. In by far the ost common form of the disease, the blood escapes into the cavity of he arachnoid membrane. Of this form the authors just quoted report 7 cases, while, according to the authors of the *Bibliothèque du Méd. Prat.* (t. vi, p. 193), the effusion always occurs in this situation. That his is not invariably correct, however, is proved by the case of effu- ion exterior to the dura mater already referred to, and by the fact hat it sometimes takes place beneath or in the meshes of the pia ater. The latter class of cases is very rare, however, in proportion o those in which the hemorrhage occurs within the cavity of the arach- oid. MM. Rilliet and Barthez did not themselves meet with a single stance of that kind, but they quote two from other writers; and M.

Valleix refers to a memoir by M. Prus, in which others are given. appears, therefore, that in the great majority of instances, the effus takes place within the cavity of the arachnoid membrane.

CAUSES.—The causes of cerebral hemorrhage are very obscure, much so, indeed, that some writers have not attempted to ascert them. They appear to be the same in both forms of the affecti Amongst the ascribed causes are the sudden disappearance of eru tions of the scalp, observed in two cases by MM. Rilliet and Barth in one of which this effect is stated to have been produced sudden by medical treatment, while in the other it followed the application poultices to a favous eruption upon the same part. This cause mu however, it appears to us, be regarded as purely illusory. The disea is stated by M. Legendre to have followed in one case a violent fit anger. It is said also to have been produced by various causes whi acted as impediments to the circulation. The obstacle may be situat within or exterior to the cranium. To the first class belong cases which the sinuses and large venous trunks of the head have been fou obstructed by coagula of blood, or by the pressure of tumors, genera of a tubercular nature ; to the latter, those in which there is inte engorgement of the superior cava produced, as in prolonged paroxys of hooping-cough, or in obstructive cardiac disease, or where there compression of this vessel by enlarged and tubercular bronchial glan Another cause is thought to be the existence of confirmed cachexia a general debility from any diseased condition whatever, in which blood having become thin and lost its plasticity, escapes from vessels with great facility. This last condition is one which alm always exists in connection with the causes cited as acting throu the agency of obstruction to the circulation, and tends of course to a ment their dangerous effects. Occasionally, also, aneurisms of the ce bral arteries, especially of the middle cerebrals, occur at an early (several cases are on record at the age of 14 years), and by the rupt of the sac give rise to excessive and rapidly fatal cerebral hemorrha

We have met with one case of extensive hemorrhage into the corpus striatum and adjoining tissue in a boy of 13, evidently connec with advanced granular degeneration of the kidneys, resulting fro previous attack of scarlatina.

In some instances the hemorrhage occurs in the healthiest and m vigorous constitutions, and cannot be accounted for in any way.

It appears that meningeal apoplexy is most frequently met with very young children, according to MM. Rilliet and Barthez, betw the ages of one and two and a half years, whilst M. Legendre did meet with a single case after three years of age in 248 autops Cerebral and ventricular hemorrhage, on the contrary, are much m common after three years of age than before, which is just the reve of the law in regard to meningeal effusion.

ANATOMICAL LESIONS.—The description of the lesions of hemorrh into the substance of the brain need not detain us long, for they much the same as those observed in the adult. When the bloo sed into cavities (apoplexy in cavities), the latter are usually small size, seldom exceeding from one to two-thirds of an inch in diam- r, though in rare cases they have been found much larger. The vity is formed by a laceration of the substance of the brain, and is ed with soft, dark coagula, or sometimes with fluid blood; the walls the cavity consist sometimes of the substance of the brain, which y be of a rosy color and natural consistence, or yellowish and soft- ed, while in other instances they are formed of more or less numer- s points of capillary apoplexy. The capillary form of effusion occurs the shape of a number of points, scarcely so large as the head of a all pin, and of a dark or brownish color, which contrasts strongly h that of the cerebral tissue. These points evidently consist of true gula, which are sometimes surrounded by small yellowish areolæ. e substance of the brain around the effusion is either white, firm, d perfectly healthy, or softened, and of a whitish, reddish, or yellow- color. The capillary effusions are generally limited within a space from a third of an inch to an inch and a half in size, but they have en found scattered over a large portion of the hemispheres.

Both forms of hemorrhage are much more common in the cerebrum an cerebellum, and occur more frequently on the left than right side. addition to the sanguine effusion there is generally considerable con- stion of the pia mater, of the venous sinuses, or of the substance of e brain itself.

In describing the lesions of meningeal apoplexy, we shall confine our marks to the effusion which occurs into the cavity of the arachnoid, is being, as we have already remarked, by far the most frequent form the disease.

The appearances presented by the cavity of the arachnoid into which e effusion has taken place vary greatly in different cases, according the age of the child, the quantity of the hemorrhage, and the period time which may have elapsed between the accident and the death the patient. It is very uncommon to find pure liquid blood, though is has been met with. In most instances, there is a bloody serum ixed with thin, reddish coagula, contained in a soft and very delicate embrane lining the internal surface of the arachnoid. Sometimes the fusion is thin, limpid, and more or less yellowish in color, while at her times it is thick and brownish, or chocolate-colored. In some re cases it is perfectly transparent and colorless. The fluid, in what- ver state it exists, appears to be the result of transformations under- one by the effused blood. The solid portion of the blood or clot is und either in the condition of more or less recent coagula, or changed to false membranes, which sometimes resemble very closely the rachnoid itself, and sometimes a true fibrous membrane. The coag- la are found in the form of thin membranes, varying between one or wo lines in thickness, and an inch and a half to two inches in size. hey are thickest generally in the centre, where they measure be- ween a fifth of a line and two lines, and are brownish or greenish in lor, and of variable consistence, according to their age. These coagula may exist upon any portion of the brain, but, according to MM. Rilliet and Barthez, are most frequently met with upon its convex surface.

The coagula just referred to undergo in some instances a curious change, of which we shall give a short description. In the course of time, the fibrinous portions of the blood are deposited upon the internal surfaces of the cavity of the arachnoid, in the form of a new membrane. When death occurs soon after the onset of the attack, the parietal layer of the arachnoid is found to be completely lined with this membraniform production, whilst the visceral or cerebral layer is covered by it only in certain points. When the case has lasted a longer time, on the contrary, the visceral as well as the parietal layer of the arachnoid may be covered with the new production, and when this happens there is formed a true sac or cyst, destitute of opening, which lines the whole interior of the arachnoid, and contains within its cavity bloody serum and coagula. At first this new membrane is reddish in color, elastic, and of a stronger texture than might be supposed from its apparent thinness and softness. Its thickness is generally about a tenth of a line. At a later period the walls of the cyst become so thin and transparent that they have been mistaken for the arachnoid itself. They differ, however, from the latter in being rather less transparent and thin, and particularly in the circumstance of presenting numerous vascular arborizations. When death occurs at this stage, which M. Legendre (whose description we chiefly follow) calls the second period, or that of complete organization of the cyst, the external surface of the latter is found to adhere intimately to the parietal portion of the arachnoid membrane, by very delicate cellular tissue, though not with so much force but that it may be detached by traction. The internal portion of the new membrane, on the contrary, which is lubricated by the serosity of the arachnoid tissue, is very slightly adherent to the layer of that membrane covering the brain.

So long as the cyst formed by the new membrane, or, as it is called by MM. Rilliet and Barthez, the *pseudo-arachnoid* membrane, contains an amount of fluid sufficient to keep its surfaces separated, its cavity is single. When, on the contrary, the walls of the cyst have come into contact, either because of the partial absorption of the contained fluid, or because the fluid has accumulated at the lowest points, or wherever there is the least resistance, the cavity becomes multilocular in consequence of the cohesion of its walls at certain points.

The size of the cyst varies exceedingly. Sometimes it covers the greater part of the convex surface of one hemisphere, sometimes the whole, while in other instances it extends to the base, forming in that case a nearly complete shell for the whole brain. The quantity of fluid varies in different cases. Sometimes it amounts only to a few large spoonfuls; in others, to one or two, or eight or nine ounces; in one case observed by MM. Rilliet and Barthez there was upwards of a pint on each side, or more than a quart in all. In most instances the hemorrhage occurs into both halves of the arachnoid membrane, so ded and protuberant. When the effusion occurs thus early in ꞏfore complete ossification of the skull, the brain does not appear ꞏessed or flattened, as it does when the disease occurs at a later l.

visceral portion of the arachnoid is often thickened, opaque, and resisting than natural. The pia mater is frequently infiltrated good deal of serosity, which sometimes has a gelatinous appear- When death has occurred in the first stage of the disease, the usually presents signs of hyperæmia. The veins on the surface hemispheres are enlarged, the cortical substance is of a bright ray color, and the medullary portion is dotted over with drops od. Sometimes the cellular substance beneath the arachnoid is ly infiltrated with serosity, at other times not. The ventricles n a very small quantity of fluid.

exact anatomical cause of cerebral hemorrhage in children is ıbject to some doubt. It appears probable that it usually results ntense determination of blood to the head, or from extreme pas- ongestion, which lead to the rupture of vessels so minute as to notice, or possibly in some cases to the transudation of blood gh the capillary walls without actual rupture. We are not aware ny careful microscopic examination has yet been made of the ion of the walls of the vessels in such cases. In some rare in- s, however, as in one witnessed by M. Legendre, the effusion is sult of the rupture of a vessel of some size. In the case observed n, death took place in twelve hours from the attack, and the left phere was found covered with a layer of coagulated blood, which scaped from a ruptured vein. (*Biblioth. du Méd. Prat.*, t. vi, p.

ɪᴘᴛᴏᴍs; Dᴜʀᴀᴛɪᴏɴ.—The symptoms of *hemorrhage into the substance brain* in the child are, as a general rule, extremely obscure and marked symptom was entire immobility. The only certain sym of the disease, therefore, would be a sudden attack of hemiplegia, e as the primary symptom, or following coma or convulsions, and las for at least several days. An attack of general paralysis would n by any means so certain, as this may exist in several other diseas childhood.

In a case which came under our charge, we believe the attac have been one of apoplexy of this kind.

CASE.—A girl, two years and a half old, apparently in the enjoyment of exc health, was suddenly, and without ascertainable cause, attacked with violent ge convulsions and entire insensibility, which lasted with very slight remissions o convulsive movements, but without any return of consciousness, for twelve h At the end of that time the convulsions ceased entirely, and she very soon reg her consciousness, remaining merely peevish and languid. She was, however, pletely hemiplegic on the left side, so that she could neither rise in bed, nor towards the right side. The paralysis diminished rapidly, but regularly, so th the end of three days she could sit up in bed, and in a few weeks was perfectly This child remained well, with the exception of rather unusual excitability, and peevishness of temper, for three years, when she died of scarlet fever. No au could be made.

The obscurity which exists in these cases will be clearly unders by any one who will read two examples given by Dr. West (*loc. c* 1062).

With a short quotation from the work of MM. Rilliet and Bart we shall pass on to the subject of meningeal apoplexy. These aut remark (*op. cit.*, t. ii, p. 54), in speaking of this affection, that "cer symptoms have been observed to exist, but of so unusual a chara and so different from what have been assigned by writers to apopl that they could not lead to a diagnosis of the disease."

We shall describe the symptoms of the *meningeal form* of hemorr under two heads: first, as they present themselves in the acute, second, as they occur in the chronic or second stage of the affectio

Unfortunately the symptoms of the acute or first stage are not n more certain and distinct than those of cerebral hemorrhage. disease may begin with fever and some convulsive movements, o happened in a case reported by M. Valleix, with violent general vulsions. Vomiting sometimes occurs at the beginning, but is usu very slight. It is difficult to know whether headache exists or n the early age at which this disease commonly occurs. The convul movements generally affect particularly the eyes, and are followe some degree of strabismus. The appetite is lost from the first; thirst is moderate; there is no constipation. Soon after the symp just described, appear permanent contractions of the hands and which are followed by attacks of tonic or clonic convulsions, du which sensibility and intelligence are abolished. Between the att of convulsions there is somnolence, which, though slight at first comes more marked as the case goes on. The attacks of convul become more and more frequent as the case progresses, until at ions of cerebral disturbance, by which they are attended, vary in kind as in degree. The sudden occurrence of violent con- is and their frequent return, alternating with spasmodic contrac- the fingers and toes in the intervals, appear to be the most nt indications of the effusion of blood upon the surface of the I need not say, however, that such symptoms, taken alone, by no means justify you in inferring that an effusion had taken Dr. West adverts particularly to the fact that apoplexy in the s especially apt to occur in those who are weakly and feeble, and o this form of the disease the appellation of the cachectic form ebral hemorrhage.

chronic form presents most of the symptoms which exist in ac- chronic hydrocephalus from serous effusion into the ventricles. anium is very large in proportion to the face; the sutures are not l; there is strabismus, with dilatation of the pupils; the sense of is generally but not always retained; the face loses its expres- if the child was old enough at the moment of the attack to show of intelligence, the latter are found to diminish rather than in- and sometimes they are lost entirely, as the size of the head nts; and the child is apt to utter loud cries, particularly during ght. The cutaneous sensibility is in general neither lost nor shed. The power of motion usually remains, though it was en- lost in one case. The appetite and thirst persist.

duration of cerebral apoplexy is very irregular. In one case l by MM. Rilliet and Barthez, it was a quarter of an hour; in er, an hour; in a third, forty-eight days; and in one reported by lleix, in a very young infant, recovery was nearly perfect in a ess than two months, when the child was seized with pneumonia ed.

duration of meningeal apoplexy is also irregular. According to

Diagnosis.—The diagnosis of cerebral hemorrhage is, as we already stated, very difficult, unless hemiplegia exist. When the commences, as it often does, with convulsions or with inflamm symptoms, it is often impossible to distinguish it from acute or t cular disease of the brain.

The diagnosis of meningeal hemorrhage is also very often extre difficult. Not unfrequently it occurs in the course of other dise and is then entirely latent. In acute, primary cases, the most im tant and distinctive symptoms are the early age of the subjects, betw one and three years generally; the violent fever from the comme ment, marked by full, frequent, and *regular* pulse; the absence of stipation; the frequency of the convulsive attacks, and particularly permanent contraction with rigidity of the feet and hands.

The diagnosis between the form of hydrocephalus which foll meningeal apoplexy, and ventricular serous hydrocephalus, is exc ingly obscure. The only circumstances which seem to have any value are the acute commencement of the disease with the symp above detailed, and the early age of the patient. MM. Rilliet and thez state that they have never known a child of two years ol younger, to die of ventricular serous hydrocephalus from tum whether tubercular or not, of the brain; in all such cases the eff has been the result of a hemorrhage.

Prognosis.—The prognosis of both forms of the disease is very g It is impossible, however, to ascertain the prognosis with any certa so long as the symptomatology of the two affections is so obscu we have found it to be. That cerebral hemorrhage is susceptib cure, however, is proved by the case reported by M. Valleix, alr referred to, in which the child had nearly recovered, when it seized with another disease which destroyed it. Recovery meningeal apoplexy is certainly extremely rare; we believe, how that we have met with one case in which this affection termin favorably.

Treatment.—The treatment must depend on the diagnosis and special character of the symptoms in each case. In a sudden severe attack, occurring in a strong and hearty child, in which symptoms of congestion of the brain are strongly marked, and w we are not yet certain that actual hemorrhage has taken place, we sh immediately resort to a general or local bloodletting. It was form customary to employ venesection in all such cases, but we believe equal relief can be obtained by freely cupping or leeching the ba the neck.

When, however, we have every reason to believe that blood has effused either in the membranes or into the substance of the brain evident that bloodletting can produce but little effect, and that on reducing the general fulness of the cerebral vessels. In such case should certainly limit ourselves to the application of a few cut cu leeches to the nucha.

It must further be remarked, however, that in many cases of cer applications should be immediately made to the head, either by oths, the ice bladder, or by cold affusion. At the same time, or y as possible after the invasion, a dose of some purgative medi- ust be given. The best is calomel, either alone or combined alap or rhubarb. If given alone, it ought to be followed in an r two by castor oil, infusion of senna and manna, salts, mag- or some active cathartic. When the symptoms are very urgent, ell to open the bowels still more speedily by a purgative enema.

nter-irritants are always useful adjuvants to the remedies already oned. They should consist at first of mustard plasters applied to tremities, and shifted from place to place. When the symptoms yield after proper depletion and the use of sinapisms for some it is well to apply blisters to the calves of the legs, and to the f the neck.

diet must be very strict, and should consist only of barley or root water, for a few days.

temperature of the room should be kept cool; and the child be placed with the head and trunk somewhat elevated, and rofoundly quiet.

the paralysis which follows apoplexy in children, we believe that ost important, and indeed the only treatment necessary, is atten- the general health of the patient, in order to give to nature time pportunity to effect the absorption of the clot which has been n out into the substance of the brain, or into the cavity of the oid membrane. This process may, however, be aided and hast- y the prolonged administration of iodide of potassium with the of iron. In cases of meningeal apoplexy, when the disease as- the chronic form, occasioning the kind of hydrocephalus we described, there is little more to be done than to attend to the l health of the child, and to endeavor to promote absorption of id by the internal administration of diuretics, and the prepara-

ARTICLE V.

CHRONIC HYDROCEPHALUS.

THIS term is applied to an affection characterized by an ex accumulation of serous fluid, either within the ventricles of th or the sac of the arachnoid.

The names *internal* and *external* have also been applied to it cordance with the position of the fluid: the former being gi those cases where the ventricles are the seat of the morbid coll and the latter indicating that the fluid has accumulated in the of the arachnoid and consequently surrounds the exterior of the Chronic hydrocephalus may either be *congenital* or *acquired*, the variety presenting the most interest in a practical point of view congenital hydrocephalus is usually associated with some mal tion of the brain which renders extra-uterine life almost impossi

In either form it is a rare disease in Philadelphia, so that bu paratively few opportunities are afforded for studying either thology or treatment.

MORBID APPEARANCES.—There are indeed few diseases in whi of more importance to correctly establish the exact nature of th bid process and the resulting lesions, since, as we shall see in part of this discussion, questions of the utmost practical value upon the determination.

Internal Hydrocephalus.—In this condition the amount of fluid very large, and varies from half a pint or a pint, to even as mu gallon. Trousseau mentions a case where the fluid weighed 30 and Frank one in which it weighed 50 pounds. The formation accumulation being gradual, the cavities of the brain accom themselves to it, the ventricles become distended, and the comn tions between their cavities are all enlarged; and occasionally t tum lucidum is perforated. This distension is usually most ma the lateral ventricles. The hemispheres of the brain yield pressure of the increasing collection in the ventricles; their tions are unfolded and flattened, so that the interval between only marked by a sinuous shallow groove, and the hemispheres thinned out as to form a layer not exceeding a few lines in thi It is not unusual, however, even when the distension of the bra proceeded to this extreme degree, to be able to trace the cine and white layers, preserving their normal relations. The cons of the expanded brain-substance varies in different cases; usuall ever, it remains normal, or is even increased, though in some has been found so soft as to tear upon the slightest traction structures at the base of the brain present the same changes sistence.

One of the most important questions in this relation, as bearin e causation of the affection, concerns the condition of the lining membrane of the ventricles.

The analogy of all other serous membranes would lead us to infer hat in those cases where no mechanical obstruction to the circulation xists, such as a tubercular tumor pressing upon the sinuses of the rain, we should look for the cause of the serous accumulation in a morbid state of the lining membrane of the ventricles. This view is lly confirmed by the study of fatal cases of internal hydrocephalus, nce in many cases this membrane is found much thickened, and ther softened or roughened and granular. The granular condition of he membrane presents many degrees: in some cases it is merely a ight irregularity of the surface, while in others there is an unevenness as marked as that of shagreen, or even a formation of granules, hich, at times, measure one-third of an inch in diameter, or even become distinctly pedunculated.

Occasionally, a false membrane is found lining one or both ventricles, s the result of the chronic inflammation of the lining membrane of hese cavities.

Even when the symptoms of hydrocephalus have not appeared until ome time after birth, the brain may be found to present positive evidences of congenital malformation, in the retarded development of some f the structures at its base.

The veins of Galen and sinuses of the dura mater are usually found n a healthy state, with their calibres quite free; a fact which is of importance in considering the mode of production of internal hydrocephalus.

In *external* hydrocephalus, the collection of fluid occurs in the sac of he arachnoid, or in a pseudo-cyst resulting from the transformation of blood-clot, as described in our remarks on meningeal apoplexy: the rain is separated from the cranial vault and compressed against the ase of the skull, as the lung is forced back against the spinal column y the fluid of hydrothorax.

The superior cerebral veins, passing from the surface of the brain to he longitudinal sinus, traverse the fluid, and at times are so much tretched as to raise the surface of the brain into points.

Excepting in cases, however, where the disease is congenital and oincident with some original malformation of the brain, there is no bsolute diminution in the size of this organ.

The character of the fluid varies considerably in different cases, and robably depends to a great extent upon the cause.

In an analysis by Spengler of the fluid evacuated in a case of hydrocephalus by puncture, the fluid was clear and colorless; specific gravity 1.010, of acid reaction, and contained no albumen. It also contained hlorides and phosphates of soda and potassa, but no sulphates. It appears, therefore, in such cases as this, that the fluid is not the result of nflammation, but rather due to a passive dropsy. It is, we believe, especially in cases of external hydrocephalus, where the fluid results

We have alluded to the fact that not unfrequently the
to present evidences of congenital malformation, and this
to the opinion that internal hydrocephalus is almost invaria
of arrested development of the brain.

Rilliet and Barthez place the effusion in this affection i
passive dropsies, and express their belief that most frequen
of internal hydrocephalus is to be found in compression of
Galen or ventricular veins, caused by the development
the cranial cavity, and usually in the lobes of the cerebru

The unfavorable influence which either of these views
upon the prognosis and treatment of this disease, is of co

On the other hand, however, the opinion is advanced t
ing-point of internal hydrocephalus is, in fact, a morbid co
lining membrane of the ventricles.

We have briefly described the appearances of this men
have now been observed in numerous well-authenticated
nal hydrocephalus, and which plainly indicate the pre-e
chronic inflammation, so that we are led to believe tha
number of cases, at least, the effusion is due to a slow i
action in the lining membrane of the ventricles. Those c
these appearances have been found associated with reta
ment of the brain, may be readily explained upon the sup
the inflammation has been excited at a more or less adv
of intra-uterine life, and that the resulting effusion has s
the structures at the base of the brain as to prevent thei
velopment. We may add that many eminent authorities,
now adhere to this view.

In cases, however, where the effusion into the ventricles
the development of a tumor in the cranial cavity, the
usually be found to occupy the cerebral lobes in such a

rding to the able investigations of Legendre, and Rilliet and , one of the most frequent causes of external hydrocephalus is hage into the arachnoid space; the effused blood undergoing which result in the presence of large quantities of clear fluid, ibed at length in our remarks on meningeal apoplexy. We have to the fact that in many cases of external hydrocephalus the ion in size of the brain is comparative rather than real; but re instances where this form of the disease is found associated alformation of the brain, which appears as a small, misshapen ressed against the anterior part of the base of the skull. In ses, it appears as though the fluid were poured out to fill up the between the skull and atrophied brain. It is also possible that onditions may be produced by the occurrence of hemorrhage arachnoid space during intra-uterine life, and before the brain ained its normal development.

TOMS; PHYSICAL APPEARANCE.—The unusual size of the head is the most striking symptoms of hydrocephalus. In many cases ted with atrophy or retarded development of the bones of the nd the rest of the body, this enlargement appears even more ous than it in reality is. The diameters of the cranium are, er, very much enlarged; cases being on record in which at the a few weeks the circumference of the head has been twenty-three , or even more.

increase in the size of the head is not, however, invariably the t sign of the disease, being frequently preceded by marked oms of nervous disturbance, or of impaired nutrition.

bones of the cranial vault which contribute to this enlargement e frontal, the parietals, the occipital, and the squamous portions e temporals. When the disease makes its appearance before the ation of the sutures and fontanelles has been completed, the grad- crease of the fluid separates these bones more and more widely. occipital bone thus is pushed backwards, the parietals outwards backwards, the frontal upwards and forwards. The increase in ize of the head is thus effected by the widening of the sagittal and al sutures, and by enlargement of the anterior fontanelle.

e displacement of the frontal bone gives rise to a marked promi- e of the forehead, which overhangs the diminutive features: while e same time the pressure of the fluid depresses its orbital plate an oblique position, contracts the orbital space, and gives rise to haracteristic appearance of the eye, the globe being prominent but ted downwards so as to be buried beneath the lower eyelid, which eals almost the entire cornea.

e membrane which covers in the enlarged sutures is often dis- ed and prominent, or remains on the normal level. A distinct of fluctuation is readily obtained by palpating one of these spaces, in some cases, principally in young infants, and where the collec- is very large, the head is absolutely translucent. When life is pro- ed, and the disease arrested, the ossification of the cranial vault is

effected by the development of numerous supernumerary bones
triquetra, in the membranous spaces. These little bones are conse
found in the largest numbers in the coronal and sagittal suture
the deficiency is greatest and most wide. When, on the othe
the disease does not begin until the sutures have united and th
nelles ossified, it is rare for the head to attain any very large si
a few cases, however, occurring in children of even nine years
the sutures have reopened under the continuous pressure,
bones have been found separated as much as half an inch.

More usually, however, in such cases, the pressure seems to
itself in thinning the cranial bones, which become reduced
shells of light, fragile compact bone. Occasionally, so far from
ing thinning of the bones, actual hypertrophy occurs, and the
the cranial vault acquire an unusual thickness, and at the sa
are dense and indurated.

The early symptoms of the disease vary much. When it is
ital, there are nearly always evidences of cerebral disturbanc
from the date of birth, or appearing within a few days. These
toms are occasionally slight, consisting merely in an unnatural
sion, with oscillation of the eyes or strabismus: or, on the othe
there may be attacks of convulsions frequently repeated.

These symptoms speedily become associated with enlargemen
head and the characteristic alteration of physiognomy. When
ease is strictly acquired, the early symptoms are even more
In one set of cases they are those of hemorrhage into the ara
in another the evidences of inflammation of the serous lining
ventricles, of more or less acute character, are present; whils
merous cases the only symptoms which precede the enlargemen
head are those of failing nutrition.

Usually the aspect of children suffering with this affection
quil, or they may even present a certain unnatural gravity and
of expression.

Cerebral Symptoms.—At times the intelligence of the child,
perhaps poorly developed, remains intact, and there is no mark
bral disturbance.

In other cases, however, the advance of the disease is attend
a gradual failure of the intelligence, and impairment of the
senses, and especially of vision.

In addition to the displacement of the globes of the eyes and
tions in the pupils already mentioned, the accumulation of fluid
causes obstruction to the return of venous blood through the
so that even at an early stage, ophthalmoscopic examination
marked changes in the fundus of the eyes. These consist in i
in the number and size of the veins of the retina, with later se
filtration or even atrophy of the optic papilla.

The nervous symptoms are at times much more marked; an
may be frequently recurring convulsive attacks, or, as West m

seen in several cases, spasmodic attacks of difficult breathing,
crowing sound in inspiration (laryngismus stridulus).

rding to Rilliet and Barthez, the common sensibility of the sur-
often impaired; and there may be more or less complete paraly-
contraction with rigidity of the extremities.

of course, difficult to estimate the amount of suffering experi-
y the little patients; ordinarily it does not appear great, and
in some cases it has seemed chiefly due to the opposition offered
cranial walls to the distension of the head.

ne case of MM. Rilliet and Barthez, the development of acute
incided with the ossification of the fontanelles.

general condition of children suffering with chronic hydrocephalus
greatly.

me cases they preserve their appetite and digestion, and appear
urished and strong to a late period in the attack; but more fre-
they present marked evidences of impairment of nutrition.

ppetite may indeed remain, but the child loses both flesh and
h; the bowels are irregular; usually constipated, but alterna-
ith temporary attacks of diarrhœa.

e majority of cases, perhaps, these symptoms are not sufficiently
nced to establish the character of the attack, until the increas-
of the head becomes manifest, and the child acquires the dis-
physiognomy of hydrocephalus. Even after marked enlarge-
f the head has occurred, however, the advance of the case is far
ing uniform. In almost every instance there are pauses of the
ariable frequency and duration, during which the child seems
m pain, improves in general condition, and the development of
d is temporarily arrested.

h is frequently directly induced by some intercurrent affection,
unconnected with the disease of the brain: while, in other
t immediately follows a violent attack of convulsions, or is pre-
y symptoms of an acute exacerbation of the cerebral disorder.
e cases, also, the patients sink into a condition of atrophy, and
rn out by the protracted suffering and malnutrition.

NOSIS.—During the early stage of the disorder, if the nervous
ms are slight, consisting merely in occasional attacks of heat of
d, attended with pulsation or tension of the anterior fontanelle,
stlessness and crying, the diagnosis must remain uncertain.
he enlargement of the head has progressed to any considerable
the expression of the little patient, taken in conjunction with
er symptoms, is usually perfectly characteristic and conclusive.
morbid condition with which it is most likely to be confounded,
ts of the skull. In fact, in some cases, the enlargement of the
hich results from these two affections, is quite identical. Usually,
r, this is not the case; and the hypertrophy of the rachitic
takes place irregularly, so that the skull acquires a square in-
f a rounded form; the orbital plates of the frontal bones are
placed; so that, although the forehead may be large and over-

gnosis in cases of external hydrocephalus, especially when of
in, is less unfavorable than when the effusion takes place into
icles.

er be the seat of the effusion, however, and the size of the
case must not be regarded as hopeless and beyond reach
al measures, so long as the functions of the brain are well
, since there are well-authenticated cases of complete recov-
hronic hydrocephalus, even when congenital.

ENT.—It must be sufficiently evident, from the previous con-
of this affection, that there are numerous cases in which all
must prove unavailing, from the serious organic disease of
which accompanies it. Under any circumstances, however,
of the treatment and its efficiency will be much influenced
ly stage at which it is instituted.

rd to the utility of various special remedies, also, there is the
iversity of opinion; and, indeed, there is no plan of treatment
sesses so much evidence in its favor as that originally pro-
Professor Gölis, of Vienna.

isease be in its incipience, and the constitution and hereditary
of the child free from taint, this distinguished physician rec-
that the head should be shaved, and one or two drachms of
d mercurial ointment rubbed daily into its scalp. While this
is being carried out, the head should be constantly protected
el cap. At the same time, calomel should be given in doses
th to one-fourth gr. twice daily, unless it irritate the bowels,
innunction alone should be continued.

pursuing this treatment, conjoined with the most careful at-
diet and all hygienic precautions, for five or six weeks, there
improvement in the condition of the child, the mercurials
radually discontinued.

dide of potassium has been highly recommended as a substi-
he mercurials above mentioned, and several cases of apparent
under its use are on record. It should be given in large
d for a considerable length of time. Trousseau, who recom-
use, joins to its internal administration the external applica-
e head of lotions containing iodine.

the disease remain uninfluenced at the end of this time, it is
add to the treatment diuretics and counter-irritants, in the
issues in the back of the neck, which may be kept open for
weeks. Dr. West recommends the frequent application of
s a substitute for the use of issues.

the employment of this or any other mode of treatment, it
ccasionally necessary to have recourse to antiphlogistic reme-
ubdue the exacerbations of heat and restlessness which occur
less frequently, and threaten the development of an acute in-
ry condition. Nor should we fail to pay attention to the
erformance of all the functions; to the maintenance of the
and digestion by the use of tonics; and in case of the exist-

ence of a scrofulous diathesis, to the administration of cod-liver oil, iodide of iron, &c.

When, despite the most careful employment of well-directed measures, the disease is clearly advancing, it is worse than useless to persist in any plan of treatment which annoys or absolutely pains the doomed child; our only endeavor should then be to subdue any intercurrent disorder which might hasten the fatal result.

More than twenty-five years ago, the use of compression of the head, to prevent its yielding to the accumulating fluid, was urged by Barnard, and experience has shown it to be a valuable adjunct to other treatment, though it is inapplicable while any acute symptoms are present, and according to West is best adapted to cases of external hydrocephalus succeeding to hemorrhage into the arachnoid space.

M. Trousseau recommends the following mode of applying this pressure: Strips of adhesive plaster, about one-third inch wide, are passed from each mastoid process to the outer part of the orbit of the opposite side; from the nape of the neck along the longitudinal sinus to the root of the nose; across the whole head, intersecting at the vertex; and finally are kept securely in position by a strip passed thrice around the head, the ends of the previous strips being turned up over the first coil of this strip, and secured by the succeeding turns.

It becomes necessary to loosen these strips instantly, if any symptoms of compression of the brain develop themselves, since the increasing pressure of the accumulating fluid may produce irreparable injury to the base of the brain, or even, as happened to M. Trousseau, detach the ethmoidal bone from its connections.

The unfavorable results of all strictly medicinal treatment, impelled physicians, at an early date, to resort to active surgical interference in chronic hydrocephalus, by puncturing the cranium and evacuating the fluid.

The operation should be performed with a delicate trocar and canula, the puncture being made in the coronal suture, about an inch or an inch and a half from the longitudinal sinus,—and in a majority of cases, no evil consequences appear to follow the operation itself. Much difference of opinion still exists, however, as to its curative influence. From a rigid analysis of 56 reported cases in which this operation had been performed, Dr. West came to the conclusion that in only 4 had a permanent cure been effected. Other successful cases have been since reported, so that the operation must be recognized as at least a justifiable one in certain cases.

The circumstances favorable to its performance are, when the hydrocephalus is external; or when internal, is due to previous inflammation of the lining membrane of the ventricles; when there is no reason to believe that the disease is congenital, and attended with arrested development of the brain; when, though the head may be very large and increasing in size, the cerebral functions are not seriously impaired; and, finally, when the nutrition of the child is still good.

Until, however, the treatment previously recommended has been lly tried, and unless the disease be evidently advancing, a resort operation would be incurring grave risks with but slight pros- f success.

nard, of Chicago, has recently recommended the injection of ns of iodine into the cranial cavity, after puncture and evacua- f the fluid. He has employed this in at least two cases, without velopment of any severe symptoms as a direct consequence of eatment.

of the cases died at the end of eight months; the other, at the f the report, only thirty-five days after the operation, had shown favorable symptoms.

advises the use of an aqueous solution of iodine, in the proportion -third gr. with one gr. of iodide of potassium, to f℥j distilled water; s from fʒj to f℥j, may be injected; the strength of the solution e amount injected being increased at subsequent punctures.

ne of his cases, twenty-one injections were practised in the course en months.

ctions of this strength are usually followed by no symptoms of mation whatever; and this exemption has led to the employment ch stronger solutions.

s Dr. Tournesko, of Bucharest (quoted by Bouchut), injected r. iodine in fʒv distilled water, immediately after having drawn puncture f℥xxiv of serum. The operation was followed by febrile excitement; but, at the expiration of fifteen days, the seemed in excellent health, the circumference of the head having shed from 56½ to 43 centimetres.

ARTICLE VI.

GENERAL CONVULSIONS, OR ECLAMPSIA.

ERAL REMARKS.—The word convulsions is a generic term applied ferent forms of spasmodic disease, very dissimilar from each other ny of their characters.

iters make different classifications of convulsions according to peculiar notions in regard to the nature and causes of these dis- s. The best division is, it seems to us, that adopted by most h writers, who arrange them by their supposed causes, making classes, *idiopathic*, *protopathic* or *essential*, *sympathetic* or *deutero-*, and *symptomatic* convulsions. The first two classes are unac- nied by appreciable lesions of the nervous centres, while the is called symptomatic, because it includes cases of convulsions are the sign or symptom of an appreciable lesion of the cerebro- l axis, as for instance, those which occur in the course of menin- tubercular disease, hydrocephalus, apoplexy, &c. In idiopathic

nd ninth, and 3 between the ninth and thirteenth years of life.
t (*op. cit.*, p. 42) states that according to the Fifth and Eighth
of the Registrar-General, the deaths from diseases of the ner-
stem in London, under one year of age, bore a proportion
per cent. to the deaths from all causes; from the first to the
ar, the proportion was 18.5 per cent.; from the third to the fifth
was 17.6 per cent.; from the fifth to the tenth year, it was 15.1
.; whilst from the tenth to the fifteenth year it was only 10.6
., and the total above fifteen years was but 10.4 per cent. Again,
the very great influence of age upon the predisposition to con-
, Dr. West states that, within the first year, the deaths from
ions constituted 73.3 per cent. of the total mortality from dis-
the nervous system; between the first and third years, the pro-
al mortality from convulsions to the total mortality from affec-
the nervous system, was 24.9 per cent.; between the third and
ars, it was 17.8 per cent.; between the fifth and tenth years, it
per cent.; while between the tenth and fifteenth years it had
o 2.4 per cent.; and above fifteen years it was but 0.8 per cent.
Vest ascribes the great frequency of convulsions in early life to
dominance of the spinal over the cerebral system, and to the im-
development of the brain.

generally stated that convulsions are more common in girls than
MM. Rilliet and Barthez found this to be the case in their private
e, whilst in the hospital, sympathetic and symptomatic convul-
ere most frequent in boys. According to our experience, they
een almost equally frequent in the two sexes, since of 92 cases
e have seen in which the sex was recorded, 47 occurred in boys
in girls.

as been generally supposed that a delicate and nervous constitu-
a powerful predisposing cause to convulsive attacks. This has
enied, however, by several recent writers, whose observation is
areful and accurate. We are disposed to believe that it is not so
a feeble or delicate constitution that predisposes to convulsions,
one characterized by a highly susceptible, irritable, and nervous
rament, which often exists, in our opinion, in connection with a
y and vigorous physical organization. Of 96 children in whom
ve seen convulsive attacks, these occurred more than once in 13.
e 13, nine presented every appearance of strong and vigorous
, with the exception that when laboring under any kind of sick-
as dentition, indigestion, the fever accompanying simple angina,
the invasion of measles, and in one that of erysipelas, they im-
tely became extremely restless and irritable, or heavy and drowsy,
t a very early period, and sometimes with very little warning,
seized with convulsions. In one, a well-developed infant in its
ear, the convulsions occurred every month or six weeks, without
ppreciable cause. Three of the 13 were delicate: one was puny and
until after the completion of the first dentition, when it grew
g and hearty; one had had an apoplectic attack when an infant

read before the Philadelphia Obstetrical Society (see *Amer. Jour. of Obstet.*, vol. ii, No. 2, August, 1869).

His record embraces 38 cases of eclampsia, 37 of which occurred in [illegible] families, in which, collectively, there were 55 children who lived long enough after birth to prove their liability or exemption; 4 having died too early to determine whether they were subject to convulsions or not.

All of the individuals included in the statistics were descendants of the first, second, or third generations, of two pairs of ancestors; of the present rising generation (the second) there are 31 members, only one of whom has as yet married; twenty of the 31 have had convulsions.

The *exciting causes* of convulsions are exceedingly numerous and dissimilar. Amongst the causes of essential convulsions are cited vivid moral emotions, violent pain, high temperature, exposure with the head uncovered to the sun, and sudden exposure to cold. In many cases, however, the exciting cause cannot be detected. The exciting causes of sympathetic convulsions may be almost any of the diseases incident to childhood. Amongst them we will cite as the most frequent, hooping-cough, pneumonia, catarrh, scarlatina, measles, violent fever from any cause, dentition, and indigestion.

Of 96 cases of convulsions, of which we have preserved notes, we have regarded only 4 as essential, while 70 were sympathetic, and 22 symptomatic. Of the 4 essential cases, we could not detect the exciting cause in any. Of the 70 sympathetic cases, it was scarlet fever in 12; pertussis in 9; indigestion in 13; pneumonia in 3; the fever of simple angina in 6; cholera infantum and bronchitis, each 3; dysentery, 4; measles and dentition, each 6; enteritis, the fever and irritation caused by a burn upon the back, and the onset of erysipelas, each 1; an overdose of castor oil (ʒvj) given to a young child with a slight cholera, 1; and lastly, fecal accumulations in the large intestine, 1.

SYMPTOMS.—*Prodromic Symptoms.*—It has been asserted by some writers that most attacks of convulsions in children are preceded by prodromic symptoms, which indicate to the experienced eye their approach. This does not agree exactly with our own experience, at least in regard to the essential and sympathetic forms, since of the cases of the former variety, well-marked prodromes did not occur in any, and of 64 cases of the latter, in which the early symptoms were noted, strongly-marked precursory phenomena occurred only in 8. We do not mean to say that there were no symptoms in the other 56 cases which might have indicated to an experienced eye the probability of an approaching attack of convulsions, but merely that there were none that were strikingly characteristic, none which pointed out clearly and decisively that such a crisis was close at hand. In many of the 56, there were symptoms that might be regarded as indicating, with various degrees of probability, the approach of the convulsive seizure; but, inasmuch as they were such as constantly exist in children not predisposed by temperament or constitution to eclampsia, without the devel-

les ; the face, for a moment pale, usually becomes livid and conges-
and the veins of the neck are distended.
his state of tonic spasm is followed quickly by the stage of clonic
m, in which involuntary and most irregular convulsive movements
r. The eyes are rarely fixed in one position, but are constantly
ated in various directions, from side to side, or upwards and down-
ds; very often there is the most violent strabismus; the eyelids are
etimes open, at others shut; the pupils may be contracted or dilated.
muscles of the face next enter into contraction, and occasion the
t hideous contortions of the features. The mouth is distorted into
ous shapes, the lips are often covered with a whitish or sanguinolent
h, and the jaws tightly clinched together by tonic spasms, or agitated
onvulsive movements, so as to produce grinding of the teeth. The
k of the body is also sometimes variously contorted by clonic con-
sions. The head is usually strongly retracted upon the trunk, but
ther instances is drawn to one side, or violently rotated. The
cles about the front of the neck enter into action, and alternately
ate and depress the larynx; the tongue, when it can be seen, is ob-
ed to be moved in different directions, and is sometimes caught
ween the teeth and severely bitten. The extremities, particularly
superior, are more violently convulsed than any other parts. The
ers are drawn into the palms of the hands, the forearms are flexed
extended upon the arms by short, rapid, and generally rhythmical
ements, the hand is quickly pronated and supinated upon the arm,
finally the whole upper extremity is twisted and distorted into vari-
positions, which it is impossible to describe. The inferior extremi-
undergo similar movements, but almost always in a less degree than
upper. The respiration during the attack is irregular, sometimes
pended by rigid spasm of the respiratory muscles, and sometimes
elerated. A spasmodic contraction of the larynx, producing noisy
pirations, has been noticed by several writers. We shall find when
come to consider the nature of this disease, that Dr. Hall was of opin-
that a more or less complete closure of the larynx is the most im-
rtant feature of the convulsive crisis. The face is often livid and
eply congested, especially when the respiration is embarrassed; the
ad is hot, whilst the extremities are cold; the pulse becomes large
d full, or frequent and small, and sometimes cannot be counted in
nsequence of the contractions of the muscles of the forearm. The
ce is not always however congested. We have sometimes seen it
rfectly white, while the convulsions were severe, and the child pro-
undly insensible. The action of the heart is tumultuous, and some-
nes irregular or intermittent. When the attack is very violent, the
ine and fæces are occasionally discharged involuntarily, but these are
re symptoms. Deglutition is seldom impossible even in the severest
. In severe, and especially in long-continued attacks, intellectual con-
iousness, and general and special sensibility, are all abolished. In
ilder cases, though consciousness is destroyed, some of the special

senses still respond to irritants, whilst in still slighter cases, the gence also is more or less preserved.

As the termination of the attack approaches, the convulsiv ments become more and more feeble, until they finally cease e and the child falls into a state of deep sleep, or of more or less p stupor.

Convulsions are not always, as we have just described them, g They may be circumscribed or partial, affecting one side of th more than the other, or one side alone, or a single arm, or in som indeed, only a single muscle, as the biceps. Sometimes they im the eyes only. The inferior extremities are rarely affected alo the partial convulsions the most frequent are those in which som of the face and upper extremities are attacked. In this form disease, the disorders of the circulation and respiration, the co tint of the face, the froth upon the lips, and the derangements ligence and sensibility, are much less strongly marked than in attacks.

In still other cases, which have been by various authors g together under the objectionable title of "inward convulsion spasm affects chiefly the muscles of respiration; at times being to the muscles of the larynx, and constituting the affection w describe in a special article under the name of laryngismus str at others affecting principally the diaphragm and the thoracic dominal muscles of respiration.

The *duration* of an attack of eclampsia concerns both the le the convulsive crisis and the continuance of the disposition to re of the crisis. Both of these are very uncertain. We have kno attack to last in all its violence eight hours and a half in one ca twelve in another, and it is said to have lasted much longer i instances. When the spasmodic movements continue during period, they are almost always interrupted by remissions. As a rule, the duration is much shorter than the periods above menti from a few minutes to half an hour. When the attacks cease and as they often do, several times a day, they leave the patient dur intervals in a state of more or less perfect consciousness or somn restlessness or delirium, or finally of coma. The period during the disposition to recurrence continues, depends principally up cause of the convulsions. If this continue in action, they will to return until it is removed.

Idiopathic and sympathetic convulsions generally consist of a attack, though there are sometimes several, which occur at inter some hours, or of one or two days. Sympathetic convulsions occur either at the beginning or termination of the disease whic complicate, and much less frequently during its middle period. cases of this form observed by ourselves, complicating measles, fever, erysipelas, pneumonia, bronchitis, cholera infantum, sim gina, and dysentery, in which the period was carefully ascertaine occurred at the invasion alone in 25, at the termination alone in

s, on the contrary, are repeated from time to time. The authors
oted state that whenever the convulsive attacks have recurred
edly within a period of a few days, they have proved symptom-
disease of the brain.

URE OF THE DISEASE.—One of the most important contributions
has been made towards a plausible and satisfactory explanation
pathology of convulsions in children, was afforded us in the
gs of Dr. Marshall Hall; and, although more advanced knowl-
f the physiology of the nervous system has shown that the part
cerebro-spinal axis involved in the production of convulsions is
ited, as he supposed, to the *true spinal system*, his theory of ex-
tor action furnishes the most ready explanation of very many
f eclampsia. Dr. Hall says (*Diseases and Derangements of the Ner-*
ystem, p. 145): "That the whole *class* of convulsive diseases con-
f affections of the true spinal system, there is no longer any
But these diseases do not all *originate* in this system." All
sive disorders are, according to this doctrine, affections of the
pinal or excito-motory system. The causes of these disorders
e of incident origin, acting upon excitor nerves; of centric
seated in the brain or spinal marrow; or of reflex origin, acting
eflex or motor nerves. They are called, therefore, according to
auses, central or centric, when they depend on disease of the
s centres; centripetal when they are excited through excitor
; and centrifugal when they depend on disease of the motor
.

Hall, as is well-known, ascribed great importance to the condi-
f the glottis in convulsions. He says (p. 323), in speaking of
y, "The second symptom is a forcible closure of the *larynx* and
ory efforts, which suffuse the countenance and probably congest
in with venous blood." At page 327, he says: "A spasmodic

ıe attack occurs in the course of some other disease, as pneu-
arrh, enteritis, pertussis, scarlatina, or measles, it is almost
sympathetic. It may possibly, however, be indicative of an
nt attack of cerebral disease. This can be determined only
on to the consecutive phenomena. If the attack be short,
ollowed by complete restoration to consciousness, it is in all
y sympathetic. If, on the contrary, the convulsive crisis be
evere, if the recovery from it be slow and imperfect, if it be
y violent agitation, somnolence, or coma, or by some persist-
of motility, there is every reason to fear an attack of disease
in.

hetic convulsions, occurring at the invasion of different local
diseases, are to be distinguished only by observation of the
that follow the crisis, which will be those belonging to the
malady whose approach has caused the attack of eclampsia.
matic eclampsia is characterized by various signs of en-
isorder, which soon follow the convulsive attack. The most
of these are severe and continued headache; diminution or
of general or special sensibility; dilatation or contraction
ils; irregular movements of the eyes; flexion or stiffness of
e limbs, or of the fingers or thumbs; disordered intelligence;
mptoms which have already been described in the articles
liseases of the brain.

sis.—The prognosis of essential convulsions must depend on
of the cause and the violence of the attack. When the
been slight, or one which soon ceases to act, or can be read-
d, the prognosis is much more favorable than under opposite
. If the convulsive crisis is short and of moderate severity,
e and respiration are but slightly disturbed, if there be but
gestion of the face, and no stertor, there is every reason to
ccessful issue in the case. Of the three cases of this class
ave seen, two recovered and one died.

hetic is more dangerous than essential eclampsia, but much
n symptomatic. The prognosis will depend chiefly on the
the disease which it complicates, and on the stage of that
which it occurs. Thus, in scarlatina, convulsions, especially
occur in the first few days of the disease, are almost always
easles much less so, and in other diseases in various propor-
ey are very apt to terminate unfavorably when they occur
alady which they complicate has been in progress for several
is is a remark made by various authors, and we have already
t of 46 cases of this form in which we carefully ascertained
of their occurrence, 25 appeared at the invasion, of which
nded favorably; 3 at the middle period, which all recovered;
the invasion and at a later period, 2 of which were fatal; and
e cases had been progressing for a considerable time, all of
ved fatal. In addition to these important elements for mak-
ognosis, we must consider, also, the duration and degree of

vous centres; and of those calculated to subdue or allay the deranged
dition of those centres and the effects of that derangement.

There are some general rules to be followed in the treatment of con-
lsions which apply to all cases, and of these we shall first speak. They
e, to place the child in a large *well-ventilated* room, if such can be pro-
red; if it have been seized in a little close room, where the atmosphere
dense and impure, removal to another room, or exposure to fresh air
fore an open window, has sometimes sufficed to terminate the crisis.
t the same time the clothes of the child should be loosened, in order
prevent all constriction, and, if necessary, taken off, to allow of a care-
l examination of the whole body. We believe it is a good rule always
place the child, no matter what be the cause of the convulsion, if it
a severe one, in a *warm-bath* (96° or 97° F.). This has frequently
oved an efficient remedy, according to our experience. It is easily
ocured in most cases, and we are quite confident that we have never
own it do harm, though we have used it in almost every case. The
tient should be kept in the bath some ten, fifteen, or twenty minutes,
until the convulsive movements cease; when taken out it is most
nvenient, and at the same time useful, to envelop it in a small, light
anket, or flannel, for a short time, before the clothes are readjusted.

In cases where the attack of eclampsia is limited to a single convul-
ve seizure, we rarely have an opportunity of instituting any treat-
ent for the paroxysm itself, since it is usually over before we reach
e patient. In such instances, bloodletting is unnecessary. If, how-
er, the opportunity offers, and if the convulsion occur in a strong and
gorous subject; if it be violent, and accompanied by a deep red, or
et more by a livid flush of the face, and distension of the veins of the
ead and neck; if it last more than a few minutes, or is repeated after
ort intervals of quiet, we would, without hesitation, recommend the
e of *bloodletting*. The detraction of blood is called for, in our opinion,
r the same reasons as in puerperal convulsions, and indeed in every
iolent convulsive attack,—to save the nervous centres from the effects
f the paroxysm, which are, in all severe cases, excessive congestion,
nd, in some, fatal effusions. There are, however, many cases, in which
e would not advise depletion; as, for instance, those in which the con-
ulsion depends upon an anæmic condition, and in which it is contrain-
icated by a naturally feeble, or by a debilitated state of the constitu-
on; those in which it is clearly unnecessary, from the slight severity or
hort duration of the attack; or those which occur in the course of other
iseases, and particularly at their termination, and in which a resort to
t is rendered evidently improper by the circumstances of the concomi-
ant affection. The quantity of blood to be taken, and the method,
ust depend on the circumstances of the case. We must be guided as
o the quantity by the age and constitution of the patient, the violence
nd duration of the paroxysm, and the cause of the attack. In a strong,
earty child, two or three years of age, in whom the attack is violent,
nd produced by some cause not likely to continue long in action and
hereby exhaust the strength, we may take from two to four ounces at

the first bleeding; and should this fail to exert an influence u
paroxysm, a rather smaller quantity may be taken in one or tw
afterwards. In younger children, and those who are somewha
or delicate, the amount drawn ought to be less. Usually sp
venesection is to be preferred; but when a general bleeding
from any cause, be employed, we may resort to cups and leeches
temples or back of the neck, or, as advised by some of the
writers, to more distant parts.

We believe it is useful in all cases of essential and sympathe
vulsions, which resist the employment of a warm bath and bl
and also when bleeding is not resorted to, to make use of an e
some kind. The act of vomiting alone is often sufficient to bre
paroxysm of convulsions which has resisted various other means
we learned first from the advice of an old and experienced practi
who was in the habit of employing emetics in all cases of eclam
children, and we have since seen it tested on numerous occasion
Hall recommends the induction of vomiting in the treatment
paroxysm of the croup-like convulsion or laryngismus stridulus,
a means of prevention in epilepsy. In the former he employs ir
of the fauces by tickling with a feather; in the latter, ipecacuan
says that a new mode of action is induced in the true spinal sys
the act of vomiting, so that the disposition to closure of the lary
expiratory efforts, is exchanged for sudden acts of inspiration
emetic which we employ is ipecacuanha. The employment of
is generally advisable, even when there is no evidence that the
is due to the presence of undigested or irritating substances
stomach, since in cases of sudden eclampsia the cause is so freq
some gastric irritation. Of course, when there is special reason
pect the presence of such a condition, the indication for the admi
tion of an emetic is even more positive.

In addition to warm baths, bleeding, and emetics, *cold applica*
the head will be found proper and useful in nearly all cases wh
of any considerable violence. Their use would be improper, ho
when the surface is pale, the features contracted, and the puls
and feeble; but whenever the skin, especially that of the head, is
colored and turgid, and the pulse full and strong, they ought to
ployed from the beginning. While the child is in the bath, it
may be wrapped in a cloth wet with ice-water; or, after it has b
moved, cold water may be poured from pitchers or a tea-kettle u
same part. If the latter is done, enough should be employed to p
the sudden reaction which inevitably takes place when but a
quantity is used. During the after-treatment of the case, the c
plications ought to be continued so long as the head remains u
rally heated.

The administration of a *purgative* dose is proper and useful i
cases of convulsions; particularly when it is found upon inqui
the child has been constipated prior to the attack; when it is su
that the bowels may contain crude food or some foreign body;

irable to produce an evacuant effect in a strong plethoric child,
lerivative action from the brain, and when the attack is attended
violent determination of blood towards that organ. The best
ative in severe cases occurring in hearty children is *calomel*. It is
ntageous because of its easy administration, its speedy operation,
the powerful sedative influence which it exerts upon the whole
omy. The dose should be from three to six grains, according to
ge. It ought to be followed in one or two hours by some other
artic, which may be either castor-oil, rhubarb, jalap, or salts. The
of all is castor-oil if it can be given. When the attack is slight or
patient weak and delicate, castor-oil is particularly applicable, as it
ates with so little irritation to the intestine, or we may employ a
ture of castor-oil and spiced syrup of rhubarb. Whatever the
edy may be, it should be given only in such quantity as to pro-
complete evacuation of the bowels and a moderate derivation
those organs, without the risk of occasioning a degree of irritation
cient to increase the disturbance of the nervous system already ex-
g.

many, indeed, in most cases of eclampsia it will be found that
gative *enemata* are of great service. They may be administered
ediately before or after the bath, and not unfrequently have the
t of stopping the paroxysm. They may consist of water holding
uspension or solution castile soap, common salt, molasses, castor-oil,
t-oil, or spirit of turpentine. If the first fails to operate in ten or
en minutes, another or even a third ought to be given.

evulsives are of the utmost importance in the treatment of convul-
s. They should be employed from the very first, or immediately
r the use of the bath. In slight attacks, they alone are often suffi-
t to suspend the paroxysm, or at least the fit often ceases under
r use. Mustard is the most useful and convenient form of applica-
in the great majority of cases. It may be used either in the form
inapisms, which are to be shifted from place to place, or in that of
foot-bath. When sinapisms are used, they should always be covered
h gauze or fine muslin, to avoid the danger of leaving any of the
tard upon the skin after they are taken off. We once saw very
ulcerations upon the feet of a child from the neglect of this precau-
. In the hurry and bustle of the moment, the feet were not washed
en the plasters were removed, and the mustard that remained pro-
ed vesications which ulcerated. In obstinate attacks, the revulsives
ht to be reapplied from time to time, taking care to shift their po-
on in order to avoid vesication.

ntispasmodics are highly recommended by some writers upon the
ase, and particularly by M. Brachet, who appears to have used with
ellent effect the oxide of zinc in combination with extract of hyos-
mus. We have had but little experience in regard to their use, but
fess ourselves indisposed to resort to them except after the employ-
t of the means already detailed; during the intervals between the

sia may be prolonged for many hours, though, as Simpson recom- nds, it should be allowed to partially pass off every two or three rs for the purpose of feeding the child. It has been employed in merous cases with the effect of arresting the convulsions, and in no tance has any unfavorable result been observed to follow its use.

Bromide of potassium, which has of late been so successfully employed the treatment of almost all forms of convulsion, may be given with vantage, especially when the convulsions continue to recur at more less regular intervals. It may be given in doses of one or two ains, three or four times daily, from the age of six months to one ar, with an additional grain for every year.

Ice.—In a case of severe convulsions in a new-born infant recorded Dr. Ellwood Wilson (*Phila. Med. Times*, Nov. 1, 1873, p. 65), the troduction of a small conical piece of ice into the rectum immediately rested the paroxysm each time.

We shall here conclude our remarks upon the general treatment of lampsia, and proceed to make some observations on the conduct to pursued under particular circumstances.

It is always highly important for the direction of the treatment, to scover the cause of the attack. This is sometimes very easy, while other instances it is exceedingly difficult, and not unfrequently im- ssible. If the attack occur in the course of some acute disease, as eumonia, catarrh, angina, enteritis, or dysentery, or during the prog- ss of one of the eruptive diseases, the diagnosis of the case is, as a neral rule, very easy. If, on the contrary, it occurs at the com- encement of one of these affections, the diagnosis will be much more fficult, unless indeed the symptoms of the concomitant disease have ready declared themselves, or should do so very soon after the con- lsion. The treatment in such cases should be that laid down in our neral remarks, modified, however, by the requirements of the par- cular disease during the course of which the eclampsia occurs.

When the attack occurs suddenly in a child previously in good health, who had been merely slightly ailing for a few hours, the detection the cause is still more difficult. The most probable causes under ch circumstances are, however, dentition, indigestion, intestinal dis- rder, or the approach of an acute general or local disease. It is easy determine by inquiry of the attendants, and by examination of the outh, whether the child is teething or not. As a general rule, the nvulsions which depend solely on the process of dentition, are slight, nd last but a short time. In all the instances that we have seen, in hich such was the only cause to be detected, the attack was of this ature. The treatment in such instances is to lance the gums, if they re swelled and inflamed over the advancing teeth; to use warm baths, nd to administer purgative and then antispasmodic enemata. These mple means will seldom fail when eclampsia depends on the process dentition alone. But when, on the contrary, there is present indi- estion, intestinal accumulations, or enteritis, as often happens during entition, the case becomes more serious, and requires in addition to malady which they complicate, with the addition of warm baths, revulsives, antispasmodics, and, after depletion, of opium, in the form of Dover's powder combined with nitre. The management of the convulsions which complicate the eruptive fevers, will be specially treated of in the articles on those maladies.

ARTICLE VII.

LARYNGISMUS STRIDULUS.

Definition; Synonyms; Frequency.—Laryngismus stridulus belongs to the class of neuroses. It is characterized by crowing inspirations, or by momentary suspensions of the act of respiration; these attacks occur suddenly, and at irregular intervals, are of short duration, cease suddenly, and are unaccompanied by cough, or other signs of irritation of the larynx. If the disease progress, it becomes associated with other convulsive symptoms, as strabismus, distortion of the face, carpopedal spasms, or general convulsions.

It is "the peculiar species of convulsion" of Dr. John Clarke; the inward fits of Underwood; the spasm of the glottis of Marsh, West, and Vogel; the laryngismus stridulus of Good; the croup-like convulsion of Dr. Marshall Hall; child-crowing; the spasme de la glotte of some of the French writers; one form of the internal convulsion of MM. Trousseau and Pidoux, of MM. Rilliet and Barthez, and of J. L. Smith; and the thymic asthma of some of the German authors. It is described by Eberle under the title of carpopedal spasms.

The frequency of the disease seems to vary in different countries. In France it would appear to be somewhat rare. MM. Rilliet and Barthez (2ème édit.) speak of having seen nine cases. At the time of publication of their first edition, they had met with only one case, and then stated that they were acquainted with only one other, published by M. Constant in the *Bulletin de Thérapeutique.* M. Blache (article Névrose du Larynx, *Dict. de Méd.*, t. xvii, p. 590) adverts very cursorily to the case. M. Valleix (*Guide du Méd. Prat.*, art. Asthme Thymique) doubts its existence as a distinct disease. In Germany, on the contrary, it would seem to be a rather frequent disease. In England it cannot be very infrequent, since Merriman says it is by no means uncommon. Copland (*Stridulous Laryngic Suffocation in Children*, *Dict. of Prac. Med.*) speaks of numerous cases that he has seen, and states that he has had as many as three under treatment at the same time. Ley speaks of having met with considerably above twenty cases. Dr. Marshall Hall remarks that "within the short space of one month, I have seen five cases of croup-like convulsion." Dr. Charles West (4th edit., p. 162) mentions thirty-seven cases of which he has preserved

M. Rilliet and Barthez (2ème édit., note, t. ii, p. 527) state that
es and Henrich have met with four, and Torgord five children of
same family affected with the disease. They quote from Reid the
ous fact that Powell saw one family of thirteen children, not one
hich escaped the disease.

mongst the causes of the disease, in addition to those already men-
ed, must not be forgotten *dentition* and *improper food.* These two
indeed, probably the most influential of all in the production of
complaint. The age at which it occurs most frequently, the last
of the first, and the first half of the second year, the very period
ing which the process of dentition is most active, would alone go
to show that this must constitute one of its most powerful predis-
ing, if not exciting, causes. The opinions of writers on this point
also conclusive as to the great influence of this vital process. Im-
per food, and especially early weaning, and the attempt to bring
child up by hand, is clearly a potent predisposing cause of the dis-
e. This has been clearly shown in the cases that have come under
own observation, and especially in one in which contraction with
idity followed the symptoms of laryngismus. The details of this case
l be found appended to the article on contracture. Dr. James Reid,
an excellent work on the disease (see *Brit. and For. Med.-Chirurg.*
r., July, 1849, p. 163), gives the following conclusions as to its eti-
gy: "1. That for the occurrence of this complaint, the cerebro-
nal system is required to be in a peculiarly excitable state, which
en acts as a predisposing cause. The period of teething is the most
ely to produce this condition. 2. That during this irritable state of
e nervous centres, the two most frequent (and in the majority of in-
nces the combined) causes are the improper description of food which
administered to the infant, and the impure and irritating atmosphere
ich it breathes." It must not be forgotten that while in some cases
ese causes act in producing laryngismus by reflex irritation from the
ms or mucous membrane of the alimentary canal upon a weak and
er-sensitive nervous system; in other cases, the laryngismus is essen-
lly connected with rickets, which has been induced by improper
eding.

NATURE AND EXCITING CAUSES; FORMS.—Much difference of opinion
s prevailed in regard to the nature and exciting causes of laryngis-
us stridulus since the disease has attracted the particular notice of
e profession. Kopp and other German authors ascribe it to compres-
on of the respiratory organs by an enlarged thymus gland, while
hers of that nation, and some of the English and French writers, class
amongst the neuroses. Dr. Hugh Ley supposed it to depend on com-
ession of the par vagum nerves by enlarged cervical and bronchial
ands. Dr. Marshall Hall considers it to be a disease of the reflex
stem of nerves. Amongst the French writers, MM. Rilliet and Bar-
ez regard it as a neurosis; Valleix and Trousseau treat of it as one
rm of convulsions in children; Blache (*Dict. de Méd.*, t. xvii, p. 584)
eaks of it as a neurosis of the larynx, which may be either sympto-

matic or idiopathic. Many recent authors, as already stated, ar posed to regard it as dependent upon the irritation of the brain, the existence of craniotabes.

Before examining in detail the different opinions quoted above, we propose doing, we will refer to the anatomical appearances malady.

The mucous membrane of the air-passages, as a general rule, is perfectly healthy, presenting neither redness, inflammatory sw œdema, nor accidental products of any kind. The lungs are usu the natural color and density, and crepitant. M. Hérard (*Bib. d Prat.*, t. v, pp. 319, 320) observed that in several autopsies ma himself, they always presented one marked change from their n condition, however, which was a very high degree of emphysema, general and strongly marked than in any other disease. This alte is believed to depend, as it does in hooping-cough, upon the imped to respiration which exists during the disease. MM. Rilliet and thez state, however, that emphysema was not present in any of autopsies.

The heart and great vessels of the thorax often, but not alway tained more blood than usual, as in asphyxia.

M. Hérard states that he has made very minute researches in r to the condition of the nervous system, examining the brain and marrow, the pneumogastric, recurrent, and diaphragmatic nerve those of the extremities even, to their terminations, without, how finding important lesions in any case. He excepts only serous ef in small quantity, and evidently consecutive, in the ventricles an ticularly in the membranes of the brain, and slight venous cong of the same kind. The tissues of the brain and spinal marrow ret their ordinary consistence, and presented neither redness nor s ing.

The condition of the pneumogastric nerves has, however, been ously reported by different authors, some having found them soft others indurated.

In some cases tuberculosis of the lungs or bronchial glands, has observed. But as these, as well as all the other lesions mentione not constant, they cannot be regarded as characteristic. In ma stances more or less marked evidences of rickets are discovered the bones of the cranium, the ribs, or the long bones of the extrem

We will now examine as succinctly as possible the different opi which have been advocated in regard to the causes of laryngismus ulus. These may be classed, it seems to us, under four heads. 1. largement of the thymus gland. 2. Enlargement of the cervica bronchial glands. 3. Organic disease of the cerebro-spinal axis. 4. which regards it as a simple neurosis, without appreciable anato alterations.

1. *Enlargement of the Thymus Gland.*—That the disease is in cases coincident with, if not dependent upon, this condition, is pr by the observations of Kopp, Hirsch, Haugsted, Kyll, and others.

athol. Anat., Syden. Soc. Ed., p. 384) says there can be little doubt at it sometimes depends upon this cause.

It appears to us, however, that it has been clearly shown by M. Hé- rd (*loc. cit.*, p. 320, 321), that the disease is entirely independent of any teration of the thymus. That observer found that in six children tween two and four years old, dying of the affection, the gland weighed tween half a drachm and a drachm in five, and four drachms and two ruples in the sixth. These cases alone show that the size of the gland aries greatly in different subjects attacked with the disease. M. Hérard as examined the gland, with a view to the elucidation of this point, in xty children dying with various diseases, between two and four years age (the age of those who had died of the disease under consideration). fifty he found that it presented the same arrangement, color, density, nd weight, as in those who had perished with laryngismus stridulus. All of these subjects exhibited the same aspect; they were pale, thin, nd most of them exhausted by diarrhœa. In ten of the sixty the gland as much more voluminous, weighing from two to two and a half or e drachms, and in one instance an ounce and a quarter. The ten bjects upon which these observations were made, died of different seases, croup, acute laryngitis, asthma, meningitis, and varioloid. All hibited the appearances of strong and vigorous health; the one which esented the largest gland was very fat, and so robust, that, though nly twenty-two months old, he looked to be three or four years. It ppears to result therefore from these researches, that the gland is able to great variations of size, and that its size bears a very exact roportion to the force of the child, being small in those who are ightly developed, or emaciated by chronic disease, and voluminous in hose who are vigorously constituted, or who have died of acute dis- ases.

That the disease does not depend, at least in all cases, on this cause, shown also by Haugsted (*Arch. de Méd.*, t. xxxiii, 1833, p. 111), who ports the case of a girl, seven years old, in whom the gland weighed e ounces, and measured four inches long, and one and a half in thick- ess, without its occasioning the least difficulty of breathing of any nd. That it occurs in children in whom the gland is very small, is own also by Caspari and Pagenstecher (quoted by Hasse, *loc. cit.*).

2. *Enlargement of the Cervical and Bronchial Glands.*—This condition a cause of the disease, so strongly advocated by Dr. Ley, and adopted on his authority by Kyll and Hasse, would seem from certain facts d arguments to be of doubtful agency.

Thus, Mr. Wakely (quoted by Kerr) states that "he possesses more n one case of tubercular affection in children, where the pneumogas- c nerve has been completely flattened by the pressure of tubercles, thout giving rise to any remarkable disturbance of the function of piration." Dr. Hall doubts the correctness of this explanation of e phenomena of the disease, and says that if the contiguity of en- ged glands with the pneumogastric nerve have any effect, it is by e spinal system of nerves, producing in mild cases partial closure glottis, and difficult inspirations, while in more severe cases the odic disposition extends to other parts of the body,—to the eye- and to the flexors of the fingers and toes. We have already ed to his theory that in very violent attacks of laryngismus, where lottis is entirely shut, the suspension of respiration produces con- on of the nervous centres and general convulsions. As already d, however, this theory has not been accepted, and we regard the sional occurrence of general convulsions in connection with laryn- us stridulus, as one proof that this latter affection is merely a par- and imperfectly developed convulsion.

he causes may be either centric, seated in the nervous centres, or ripetal, in the excitor or incident nerves. In the great majority of s, the causes are centripetal, consisting of various morbid condi- s situated at the peripheral extremities of the nerves, which become es in consequence of the irritation they establish in the nerve-ex- ities: this irritation is transmitted to the nervous centres, and ce reflected through the various efferent or motor nerves to the rent portions of the muscular apparatus affected in the disease, the nx, face, extremities, and lastly, in severe cases, the whole body. principal causes of this class are dental irritation occurring during ition; gastric irritation, arising from excessive or improper food; stinal irritation from constipation, intestinal disorder or catharsis; perhaps the pressure of an enlarged thymus or of enlarged cervical ronchial glands.

he centric class of causes includes such as are seated in the nervous tres. These are much less common than the former class, and give to a vastly more dangerous and intractable form of the disease. emost among them, according to recent observations, must be placed development of "soft spots" in the occipital bone in connection h rickets, which allows pressure upon the back of the head to in- e irritation of the brain. There are also different morbid conditions he brain and spinal marrow, as inflammation, congestion, and effu- , which appear to have occasionally proved the cause of laryngis- s. That such causes sometimes produce the disease is shown by the e of exostosis already quoted from Coley, that of spinal irritation n Kyll, that of Dr. Hall, in which he found induration of the medulla ongata, and the one of spina bifida reported to Dr. Hall by Mr. ans. In the latter case the tumor was seated on the loins. Mr. E. posed to treat it by compression, but on making the attempt found t it was followed immediately "by the affection described by Dr. J. rke" (*Hall, loc. cit.*, p. 144). Other centric causes, which have been ribed in some rare instances, are passion, vexation, fright, contra- tion, &c., &c.

his theory of the nature of the disease likewise accounts for the ying character of the convulsive symptoms. The laryngeal spasm, m which the disease derives its name, does not constitute the whole lady; it is only one of the symptoms, though the principal one, and

he disease continues to progress, it almost always becomes asso-
l with other spasmodic symptoms. The thumbs are drawn tightly
he palms of the hands, and the fingers clasped over them, which
to the back of the hands a swelled and tumid look. At the same
the toes are strongly flexed under the feet, and the insteps look
ed like the backs of the hands. Sometimes the hands are bent on
orearms, and the forearms on the arms. There is often distortion
e face. In severe cases, or when the disease has continued for a
iderable period, epileptiform convulsions make their appearance,
generally prove fatal.

e disease is apyretic in a large majority of cases. When fever
s it almost always depends on the condition which has occasioned
disordered action of the excito-motory system, or on some acci-
al complication. The pulse during the paroxysm is small, corded,
d, and sometimes imperceptible. In the intervals it is natural or
ly so.

eath may occur very early in the disease, or after some weeks,
ths, or according to Kyll, years. Vogel states (*op. cit.*, p. 272) that
netimes even the very first attack terminates in death, and a seem-
y perfectly healthy child may be carried off in a few seconds." In
se quoted by MM. Rilliet and Barthez, death took place at the end
hree weeks, and in another, in twenty months.

he *duration* is very uncertain. It generally, however, lasts several
ths. In one of our own cases it lasted eighteen days, then ceased
even months, returned, and proved fatal in five days. In another
, the attacks of spasms returned from time to time, during a period
hree weeks. In another case, the notes of which were obligingly
ished us by our friend Dr. Benedict, and which we shall append to
article, it lasted, in connection with contracture, four months and
lf, and was followed by perfect recovery.

ther Forms of Internal Convulsions.—We have, for the sake of clear-
, limited ourselves so far in the present article, to cases where the
m is confined to the muscles of the larynx, when the attack might
alled one of *laryngeal convulsion.*

n other cases, however, the spasm may affect, either solely, or in
unction with the larynx, the diaphragm, and the respiratory mus-
of the abdomen and chest, constituting what is termed by some
hors "*internal convulsions.*" The most common form of internal con-
ion as described by Trousseau, "is characterized by rolling up-
ds of the eyeballs, by an almost complete loss of consciousness, by
reme difficulty or impossibility of deglutition, by irregular respira-
, at times barely perceptible, or free, deep, and blowing, indicating
t the diaphragm and the respiratory muscles of the abdomen and
st are especially affected."

hese internal convulsions may be associated with partial or even
eral convulsions of the face and extremities; more frequently, how-
r, they are accompanied by more or less general *tonic* muscular con-
ction.

In most cases, as indicated in the passage quoted from T
the muscles of the pharynx are involved, and there is marked
gia or utter inability to swallow.

In some instances, also, the frequency, irregularity, and sm
the pulse, and the irregular and tumultuous character of the
the heart indicate, as pointed out by Rilliet and Barthez
t. i, p. 510), that the organs of circulation probably share in th
sion.

The degree in which the larynx participates in the atta
much in different cases; at times there is no obstacle whateve
entrance or exit of air through its cavity, at others, the spa
muscles is so extreme that the passage of air is entirely ob
whilst in still other cases, of which the one communicated to u
late Prof. Pepper, and quoted at the end of this article, is an
respiration is difficult and accompanied by a stridulous noise.

The above description applies to those cases of internal
sions where the convulsion is complete, and presents both the
tonic contraction and the subsequent clonic spasms of the re
muscles.

But in other cases, the attack consists merely of a sudd
spasm of the diaphragm and respiratory muscles of the abdo
chest, followed by a sudden and complete relaxation. The en
pension of the respiration during the spasm would of course
induce fatal asphyxia, but fortunately the attacks, as we h
with them, have usually been so brief as not to cause any d
symptoms.

These attacks are popularly known in this country, and
scribed in the earlier editions of this work, under the title of "
breath Spells."

We have met with a considerable number of well-marked
the affection, and believe it to be of quite common occurrence.
dom happens that the physician is consulted in regard to it,
who have charge of children in whom it occurs, almost always
it to temper, and think it of but little moment. It appears to
result of a sudden spasm of all the respiratory muscles, so
child ceases for the time to breathe, from which circumstance,
it has received its name of "holding-breath spell." There is
ulous sound, nor hoarseness of the cry, nor indeed sound of a
The face is contracted and bluish, the base of the thorax retra
immovable, and the limbs violently agitated at first, and th
after a few seconds, or perhaps a minute in severe cases, th
yields, the child instantly makes a full inspiration, unatten
stridulous sound, and generally bursts into a loud fit of cryin
lasts for a few moments, after which the child seems perfectly we
the attack is followed by excessive paleness, with languor or pro
lasting half an hour or even longer. The attacks recur with
frequency; there may be several in a day, or but one, or they m
only at intervals of several days. The most frequent cause of

xysms is contradiction. They are determined also by fright, pain, and rying. They never occur spontaneously, and never during sleep, so r as we know. It is to be distinguished from laryngismus stridulus y the absence of the crowing sound, by its not occurring spontaneously r during sleep, and by the absence of carpopedal or other spasmodic ymptoms. It is, we believe, a spasmodic affection of respiration, analogous to, though not exactly similar to laryngismus stridulus. We have ever met with it except during the period of the first dentition, and always in children of nervous temperament. The cases that we have met with all recovered, and in one only did the life of the child seem to be at all endangered. In this instance the paroxysms had recurred very frequently for eleven months, and on two occasions were terminated by slight spasmodic movements of the limbs, lasting only for a few instants, and unaccompanied by insensibility or other dangerous symptoms. After these attacks the child was removed to the country, where he covered perfectly.

DIAGNOSIS—The only disease with which laryngismus stridulus is ely to be confounded is spasmodic laryngitis, or false croup. From is it may readily be distinguished by the absence of catarrhal symptons, or fever; by the fact that the paroxysms occur indifferently in e day or night, and that they are much more frequent; by the duran of the paroxysms, which last only a few seconds, or more rarely a nute; by the absence of cough or hoarseness of the voice, even ring the height of the paroxysm; by the occurrence of tonic muslar spasms, and convulsions; and finally, by the chronic course of the lady: the converse of all of which symptoms exist in spasmodic oup.

PROGNOSIS.—The prognosis of laryngismus stridulus is always serious, ce even the mildest cases may terminate fatally in any one of the roxysms. It is, however, far from being so dangerous a disease as s been supposed by some writers, and amongst others M. Valleix, ho states that it is almost always fatal (*Guide du Méd. Prat.*, t. i, p. 4). Of 56 cases collected from Pagenstecher, Hachman, Ley, Kopp, all, Constant, Rilliet and Barthez, Kyll, and 5 from our own observaon, making 61 in all, 4 died of intercurrent or consecutive diseases, hile of the remaining 57, 32 were cured, and 25, or about 43 per cent. ed of the malady itself.

MM. Rilliet and Barthez quote from M. Lorent, the translator of Dr. eid's work, the statement, that of 289 cases collected from various riters, 115, or rather more than 39 per cent. proved fatal.

The prognosis given by the physician ought to depend in great easure upon the cause of the malady. When it depends on difficult entition, improper diet, or gastro-intestinal disease, whether or not onnected, as they very frequently are under these circumstances, with ckets, the case will in all probability terminate favorably if the proper reatment can be, and is, brought to bear against those morbid condions; while if it occur under the influence of a centric cause, or of enrgement of the cervical or bronchial glands, the prognosis becomes uch more unpromising.

or fifteen drops should be given four or five times a day, or
ly with the brandy. Of tonics, the most suitable, it seems to
inine, in the dose of a quarter of a grain three or four times
the citrate of iron and quinine, in the dose of half a grain,
the same way. Another very excellent stimulant and tonic is
ham's tincture of bark, of which about five to fifteen drops
prescribed in the place of brandy. This kind of treatment
cely fail to stimulate the digestive power of the stomach to
ctivity after a few days, and of course to improve the nutritive
s and the strength of the patient. In addition to this we would
nd the persistent use of the remedies which, as cod-liver oil
compound syrup of the phosphates, are most beneficial in the
t of rickets. The reader is referred to the article on the latter
or more detailed discussion of this point.

the disease is associated with marked intestinal irritation, we
uire carefully into its nature and causes. It may be connected
stipation, diarrhœa, or with an unhealthy state of the contents
wels. It is often dependent on the presence of crude or imper-
gested food in the alimentary canal, and when this is the case,
proper method of treatment is to attend to the state of the
function, and to discover and employ a proper diet. The
re quite frequently very torpid, and the stools, when obtained
ine, are often found to be very offensive, light-colored, and pasty,
s generally resulting from imperfect action of the liver. Under
cumstances small doses of mercurials, or taraxacum, should be
to in combination with or followed by mild aperients, as
l or rhubarb. One of the very best cathartic remedies, when
bination of symptoms is present, in Chaussier's mixture of
and aromatic syrup of rhubarb, consisting of three parts of the
ubbed up with five parts of the latter. The dose is a tea-
every two or three hours, until the bowels are well evacuated.
tle in its action, and yet very efficient, gives no pain, and is
ken. If a mercurial be desired, about two or three grains of
s, one or two grains of calomel, or four grains of the mercury
lk, may be incorporated into an ounce of the mixture. When
is present, it must be treated according to its causes, as
nded in the articles on simple diarrhœa and entero-colitis.
n the contrary, constipation is a marked symptom, this is to be
y regulation of the diet, by the daily use of warm water en-
articularly recommended by Dr. M. Hall), or, if these do not
by the exhibition of small doses of the mildest aperients.

all states that by strict attention to the dentition process, and
c and intestinal irritation in the *dawn* of the disease, he has
d in curing all the cases he has seen but one, and in that he
duration of the medulla oblongata.

se who suppose the disease to depend on enlargement of the
cervical, or bronchial glands, it has been proposed to endeavor
re a reduction of the hypertrophy of those glands by frequent

applications of leeches, by the use of exutories upon the thorax, by the employment of strong purgative medicines, and by the administration of mercury, digitalis, and iodine. In a case apparently connected with enlargement of the bronchial or cervical glands, we should prefer to direct our treatment to the invigoration of the general health by attention to diet, by the use of tonics, and by proper exposure to fresh air, whilst we should employ internally, cod-liver oil, iron, iodide of potassium, the preparations of iodine, and antispasmodics.

When the disease depends on a centric cause, this must be treated, if it can be detected, according to its nature.

Antispasmodics.—Whatever be the causes of laryngismus stridulus, it is undoubtedly proper, whilst our chief efforts are directed towards their removal or mitigation, to make use of antispasmodics in order to moderate the spasmodic symptoms which are but the expression of those causes. The remedies of this class most highly recommended are cherry-laurel water, belladonna, valerian, musk, assafœtida, oxide of zinc, bromides of potassium and sodium, and small doses of ipecacuanha. The most efficient are probably the oxide of zinc, which is recommended by M. Brachet (*Traité Pratique des Convulsions dans l'Enfance*) as one of the best antispasmodics that can be used in the convulsions of children, the fluid extract of valerian, the preparations of belladonna, aromatic spirit of hartshorn, and the bromides. M. Brachet always combines the oxide of zinc with extract of hyoscyamus, and gives at least two grains of the former with four of the latter, in divided doses, in the twenty-four hours. He states that he has never given more than ten grains of each in the period mentioned. Of the fluid extract of valerian, about a teaspoonful, or even more, might be given in the twenty-four hours, to a child one or two years old. It should be mixed with water, of course. The aromatic spirit of hartshorn may be given as recommended above. We would also recommend the use of the bromides of potassium and sodium in full doses.

It must never be forgotten, however, that remedies of this class are to be employed only as palliatives and adjuvants, and not as curative agents.

Iron.—Of all the remedies to be employed, after attending in the strictest manner to the removal of the exciting causes of the disease, there is none of such almost universal applicability as iron or its preparations. The patient is almost invariably, owing to the faulty state of the digestive and nutritive functions, more or less anæmical, a condition imperatively demanding iron; and as this remedy rarely conflicts with the other means indicated, it should be given probably in all, or nearly all the cases. The metallic iron in powder or in lozenges, in doses of half a grain or a grain three times a day, or the iodide of iron in doses of from two to four drops three times a day, in a mixture of syrup and cinnamon-water, are the best preparations, and they should be continued, as a general rule, throughout the treatment of the case.

We have already referred to the great value of the prolonged use of

which improve the general nutrition, and particularly coun-
e rachitic diathesis so often present in cases of laryngismus.
these may be mentioned cod-liver oil, arsenic, and the alka-
sphates.

nent during the Paroxysm.—When the child is attacked with a
m of difficult breathing, it should be lifted at once into a sitting
if it be reclining, and fanned, or carried to an open window, if
ther be not too cold. At the same time cold water should be
d upon the face, and if the attack be violent, we may resort to
recommended by Dr. Hugh Ley and Dr. Hall, tickling of the
o produce nausea or vomiting, or irritation of the nostrils with
er, so as to occasion gasping respiration. In a case which oc-
to the late Dr. C. D. Meigs, accompanied with severe general
ions, he found that the suspension of the respiration could very
y be broken in upon, and the paroxysm sometimes averted, by
lication of a piece of ice, wrapped in a cloth, to the epigastrium
er part of the sternum.

dmunds (*Med. Times and Gaz.*, March 12, 1864) also found that
ication of one of Chapman's ice-bags to the spine, did more than
g else to keep off the paroxysms in an obstinate case of laryn-

event congestion of the brain and effusion, which sometimes
ace as the effects of the attacks, Dr. Hall recommended a few
or cups to the head, the application of an alcoholic lotion over
le head, or the use of the ice-cap. At the same time the bowels
be speedily moved by large enemata either of simple water or
r containing salt.

ses, especially of the more general form of internal convulsions,
he attacks are so frequently repeated and severe as to threaten
would recommend the induction of partial anæsthesia by either
chloroform, as advised in the article on eclampsia.

val to the Country.—When the disease persists in spite of the
bove recommended, and especially when it depends on dentition
stive irritation, change of air will often produce a wonderful
nd should always be tried.

ollowing cases are reported in full, as illustrating the peculiari-
treatment of this curious affection:

—"The subject of this case was a boy, born in July. He was a large, hearty
d remained well until January of the following year, when his mother's
ed, and he was placed upon artificial diet. From this time to May fol-
is diet was cream and water, barley-water, oatmeal, arrowroot, pounded
boiled with water, and gum-water, all of which were tried in turn, being
and administered with the greatest caution as to time and quantity. A wet-
tried, but the child refused the breast entirely.

e 27th January, he was attacked with diarrhœa, which lasted one week.
followed by constipation, the stools being white, firm, tenacious, and offensive.
tipation continued up to July, when it was replaced by diarrhœa.

uary 4th. On this day, the child being seven months old, was first ob-
spasm of the larynx, producing a shrill, croupal whistle, or *ooh*, *ooh*, during

ıssumed an expression of great anxiety, the respiratory muscles contracted
ence, and there seemed to be for the time imminent danger of suffocation.
eral seconds or a minute the shrillness of the sound diminished, the strug-
bsided, and soon the respiration became perfectly natural, and the child
rell. The paroxysms were usually followed by fits of crying, which, how-
re easily pacified.

aroxysms gradually diminished in frequency and violence, and ceased en-
ter the 13th of April. The treatment consisted simply in careful attention
neral health, and in the frequent use of warm baths and mild nauseants.

ild remained perfectly well, with the exception of a slight attack of cholera
n, until the following November, seven months after, when the disorder re-
Several paroxysms occurred between the 12th and 17th of the month; but
were slight and unattended by other symptoms of illness, the mother was not
, and paid but little attention to them. On the 17th of the same month, the
s sitting on the floor amusing itself with some playthings. There were no
in the room except young children. They saw the little thing stoop forward
r, as though in play, and did not therefore regard it immediately. As it re-
in that position, however, they went to it, took it up, and found it dead. It
shed suddenly, no doubt in one of the paroxysms of laryngismus.

ıtopsy was made, in which the larynx and thoracic organs were examined,
ing was found to explain the cause of the disease or the sudden death.

he following interesting case, communicated to us by the late
Villiam Pepper, the attack consisted of persistent laryngismus
ıs, accompanied by frequently recurring internal convulsions
g the diaphragm and other respiratory muscles, and by tonic
tion of the muscles of the arms.

—A boy, aged four months, remarkably healthy and well-developed, after
a few days with slight catarrhal symptoms, was suddenly seized with a pe-
ridulous crowing respiration.

the child about half an hour from the commencement of the attack, and
with a pulse of 140, pale face, and livid lips. The pupils were contracted,
hands firmly clenched; the crowing sound was very loud, and attended every
spiration. At times the respiration and circulation would be entirely sus-
for many seconds, followed by great lividity of the surface and coldness of
emities.

or ten leeches were applied behind the ears, the feet placed in warm water,
se of castor oil administered, to be followed by saline enemata.

hours from the commencement of the attack, all the symptoms were greatly
ted; the wrists and fingers were firmly flexed, these spasms coinciding with
st of the circulation and respiration; there was now perfect insensibility.
ld was placed in a warm bath, cold water was applied to the head, and a sina-
ng the spine, without, however, affording any relief to the crowing inspira-
other spasmodic symptoms.

e suggestion of Dr. C. D. Meigs, the child was now placed on its right side,
e shoulders elevated; this position to be maintained at least six hours. At
of that time the child was in no respect improved, and accordingly, at the
on of Dr. M., six leeches were applied over the cardiac region; f℥j of lac.
d. was thrown into the rectum, and a blister applied to the back of the neck.
child expired at midnight, about ten hours from the commencement of the
the crowing respiration, with more or less asphyxia, having persisted through-

sy, thirty-six hours after Death.—Mucous membrane of the larynx injected,
ther respects natural. Thymus gland three and a half inches long, two and

th laryngismus stridulus, under the title of "carpopedal spasms," erebral spasmodic croup," "croup-like convulsions," &c., &c. We lieve, however, that it will be useful to describe it separately from at disorder, for though of the same nature, and sometimes associated ith it, it often exists as an independent affection.

CAUSES.—It is most common between the ages of one and three ars. It is much oftener sympathetic than essential, and its most equent causes are dentition, disordered states of the digestive function dependent upon improper alimentation, anæmia and its accomanying nervous excitability, brought about by digestive and nutrie derangements, pneumonia, bronchitis, masturbation, and unfavorble hygienic conditions. In some few cases, the disease is truly sential, since no pathological cause for it whatever can be detected. is merely necessary to say that it is also often symptomatic of disease the brain, but of that form of the affection nothing will be said in e present article.

NATURE OF THE DISEASE.—It appears to consist in a functional dengement of the motor tract of the cerebro-spinal axis, occurring ithout any cause that can be detected, or determined by the existnce of some irritation affecting incident excitor nerves. We once saw child two years of age, who, after a restless, uneasy night, presented the morning tonic contraction of the flexors of all the toes of both et, so that the insteps were swelled, and looked smooth and polished. here was no other sign of sickness except peevishness. Learning on quiry that the bowels had been somewhat constipated for several ays, and that the materials of the scanty stools which had been disharged were dark-colored and very offensive, we ordered a dose of astor oil containing two grains of calomel. The contraction connued unyielding until six o'clock in the afternoon, when a very copius, dark-colored, viscid, and offensive stool occurred, and the contracon immediately ceased. Here the cause of the contraction was evently an accumulation of unhealthy fecal matter in the intestine, which, by irritating certain sensitive fibres of the excito-motory system, aused a reflex motor action that gave rise to permanent muscular ontractions. In other cases the disturbance of the excito-motory ystem depends on the irritation of excitor nerves occasioned by he process of dentition, by indigestion, by diarrhœa, pneumonia, leurisy, &c. In other instances, again, to which the term essential must be applied, it seems to depend simply on general debility and næmia, which are well known to be productive of functional disease f the nervous system.

SYMPTOMS; COURSE; DURATION.—The disease rarely attacks children reviously in good health, but generally those already suffering from ome disorder of the general health, or a severe local affection. When ympathetic, the first symptom noted is the contraction which constiutes the disease. When essential, on the contrary, the onset is sometimes marked by various nervous symptoms, such as giddiness, head-ain. When once developed it may last from weeks to months, either wly increasing in severity, or remaining stationary for a length of e. As a general rule, after it has lasted for some time, it becomes ermittent, sometimes diminishing or even disappearing entirely for eriod, then reappearing or increasing, to subside or cease again, and changing without regularity or evident cause, until at last recovery adually takes place, or death occurs from the concomitant disease, or a paroxysm of convulsions.

DIAGNOSIS.—The only difficulty in the diagnosis of idiopathic contrac- n is to distinguish it from symptomatic contraction, or that which pends upon cerebral or spinal disease. The kinds of cerebral disease ich most frequently occasion contraction are tubercle of the brain, d meningeal hemorrhage. The distinction can generally be made th considerable facility, however, by attention to the various dis- ders of intelligence and sensibility, to the fever, constipation, vomit- g, and different modes of invasion and progress which characterize e symptomatic form. The following table, taken from MM. Rilliet d Barthez, will assist in the diagnosis.

SYMPTOMATIC CONTRACTION.	ESSENTIAL CONTRACTION.
Cerebral symptoms, special functional orders (convulsions, strabismus, dilata- n of the pupils, &c.), preceding or ac- mpanying the contraction.	Similar cerebral symptoms, but only in exceptional cases, sometimes accompanying, but never scarcely preceding the contraction.
In many cases irregularity of the pulse.	No irregularity of the pulse.
Generally partial, and commencing ally in the elbows and knees, and in a gle extremity.	Binary, commencing in the fingers and toes.
Almost always permanent.	Remarkably intermittent.

PROGNOSIS.—The prognosis must depend on the cause of the malady. he contraction itself has no influence whatever on the termination. he fatal termination has always resulted from the anterior or concom- ant disease. Six cases observed by M. Barrier all recovered. The case mmunicated to us by Dr. Benedict, which was connected with laryn- smus stridulus, and one very severe one that occurred in our own actice, also terminated favorably. The prognosis is favorable, there- re, when the attack occurs in a child of naturally good constitution, nd when the cause of the disease is not a permanent or incurable one. he possibility of the occurrence of fatal convulsions should always lead to make a guarded prognosis.

TREATMENT.—The treatment must depend on the circumstances under hich the disease has made its appearance. When it occurs in the urse of an acute local affection, the treatment must of course be that hich is proper for the concomitant disorder. When it depends on ntition, or on gastric or intestinal derangement induced by improper et, the treatment is the same precisely as that recommended for ryngismus stridulus dependent on the same causes.

It may be stated that, as a general rule, all violent remedies, as bleed- g, calomel, except in very minute doses as an alterative, drastic cathartics, and blisters, can scarcely fail to be injurious, unless festly necessary in the treatment of the concomitant affection.

It is proper in almost all cases to combine with the treatment al recommended, the employment of antispasmodic remedies, partic when the contractions persist after the removal of the primary di

The best remedies of this class are the warm bath, used every belladonna; conium; bromide of potassium; the fluid extract of vale assafœtida, and camphor. We would further recommend the use of edies calculated to improve and invigorate the nutrition, and par larly cod-liver oil and iron. The diet ought generally to be nutri and strengthening, particularly when the patient is weak and deli

In conclusion we may state that the treatment should be very the same as that proposed for laryngismus stridulus, and we ther refer the reader to that subject for more detailed information.

CASE BY DR. J. F. MEIGS.

CASE.—The subject of this case was a girl nine months old. The parent healthy persons, but the mother, owing to some idiosyncrasy, had made but nurse for the preceding child, and I had strongly advised her, therefore, at the of this one, to give it a wet-nurse. This was not done, however, and it was necessary to feed the infant a great deal from its birth. During the early mon its life it had some slight attacks of disorder of the digestive system, but being to the country for several months in the summer, it there improved very much being brought back to town I saw it, and found it pretty well developed, but pale, and, on the whole, delicate-looking. It was still nursed by the mother, b to any very considerable extent, as it was obliged to be fed several times each The food consisted of different farinaceous substances made with cow's milk.

On the left forearm of the child there was situated a congenital aneurism by tomosis, which had grown, by the age of nine months, to be as large as a five piece. It was deemed necessary to remove this tumor, and, accordingly, on the of January, 1852, a surgeon tied it with a needle and double ligature. The chil the operation very well, was soon quieted, and was cheerful and ate well unti evening of the 15th, when it was attacked with fever, which lasted all night was accompanied with a good deal of cough and some gurgling in the fauces the following morning, at about 7½ o'clock, it had a slight convulsive seizure, la a few moments, and marked by stiffening of the body, and a staring expression eyes. In the middle of the day, it was seized again, and during that and the day (17th), up to 10 P.M., it had twenty-four convulsions. These lasted from to eight minutes each; they were general, and consisted of flexions of the l working of the face, and were attended with unconsciousness. There was no thotonos during the attacks, no extensions of the limbs, and no contraction jaw. Between the seizures, the child nursed perfectly well, sucked the finger, no stiffness of the lower jaw, and was perfectly conscious. There was, during two days, some fever, as the skin was too warm, and the pulse between 161 and The respiration was more frequent than natural, there was a good deal of c some catarrhal râles in the chest, and also some gurgling in the fauces. The were scanty, pasty, and white. There was a well-marked but rather faint ra the limbs and trunk, like erythema or mild scarlet fever, and the lymphatic g on both sides of the lower jaw were somewhat swelled, and quite hard. The ment directed was one-sixth of a grain of calomel every two hours; two drops of tion of morphia with five of fluid extract of valerian, to be given also every two h warm immersion baths, and mustard foot-baths. On the second day, blisters applied behind the ears.

On the 19th, the child was better. There was no convulsion; she noticed smiled a little, nursed heartily, and took some arrowroot-water.

g all this time the tumor in the arm was not at all inflamed. It was neither to the touch, nor swelled. It was suppurating slightly. Under the idea convulsions might depend in part on the operation, and in order to promote tion, a warm poultice was kept constantly applied over the tumor.

hild continued better, with the exception of slight angina and severe cough, e morning of the 22d, when it waked early, crying violently as though in ain, and I found the fingers of both hands strongly flexed at the metacarpal tions over the thumbs, which were themselves drawn into the palms of the The phalanges, though bent, as just stated, at the metacarpal articulations, ffly extended at the phalangeal articulations, and at the same time separated ch other. The hands were flexed at the wrists. The toes were flexed, and stiffly cramped at the ankles, and the insteps, as also the backs of the hands, welled and cushiony. Any attempt to open the hands was painful and caused The pulse was frequent and small, the skin pale, and very slightly too the intelligence was perfect. The jaw was open, and the act of sucking was ed, but with some difficulty. On the previous day the bowels had been opened mes, and on this day once; the stools were scanty, pasty, and white. At 9 rdered two drops of solution of morphia, five of the fluid extract of valerian, nty of milk of assafœtida, to be given every two hours.

.—Same state, except that the contraction is stronger. There is more heat of uch crying, and a restless, distressed motion of the head. At 4½ o'clock, two laudanum were given with assafœtida. A teaspoonful of the following mix- s ordered every hour:

℞.—Mass. Hydrarg.,	gr. iij.
Ol. Ricini,	fʒiij.
Syr. Rhei. Aromat.,	fʒv.—M.

м.—Has taken three doses of the mixture and had one large, whitish, pasty Much easier. Has slept a good deal. Contractions not so strong, as the an be opened more easily, and with very little pain. Skin soft, of natural ture, and moist. Ordered one or two more doses of the mixture, and a repe- the laudanum and assafœtida, in case of restlessness. During all this time or has not separated. A process of ulceration is going on around the liga- ut there is no inflammation of any consequence; the arm is not swelled, and neither redness nor soreness to the touch.

ary 30th.—The contracture diminished very much for two days, and then re- so that during the 27th, and 28th, and 29th, it was very marked, the forearms exed on the arms, and the hands strongly flexed on the forearms. The feet re very stiff, and strongly flexed. The head was occasionally but not con- retracted upon the trunk. The child evidently suffered very much, as it cried tly and was very restless, except when under the influence of anodynes or smodics. The bowels are sluggish, but have been kept open by the oil and b mixture. The dejections were generally whitish and pasty, but occasionally as a healthy yellow stool. On the 28th the following mixture was ordered:

℞.—Ext. Valerian. Fluid,	fʒj.
Sp. Ætheris Comp.,	fʒss.
Liq. Morph. Sulph.,	gtt. lx.
Syr. Tolutan.,	fʒvj.
Aquæ,	f℥ij.—M.

spoonful to be given every hour or two, when there is much suffering or rest- .

he evening of the 29th the ligatures were removed, as they had become en- ose, though without cutting off the tumor. The diseased point was not much d, nor was it very tender.

17th.—The child has improved very much. She is fatter already, h tranquil expression, takes more than she did from the previous nu much less of the milk. The stools are now regular, occurring twic aid, and of a natural appearance. The sleep of the child is better n been at any time since the first wet-nurse was dismissed. The attacks are already much less frequent, and less severe. The hands are v natural condition. The child is less nervous, not starting now as form

To continue the brandy and iron.

From this period the child continued to improve regularly in healt moved to the country during the summer months, and when broug autumn, was entirely well, with the exception that she was less forw than most children, but not more so than might have been expected been dangerously ill for so long a time. Her intelligence was good i

February 5th, 1853.—We have seen this child to-day, and find he health, except that she is rather smaller in size than is usual at her pr has been weaned now for about six weeks, and eats heartily and diges dinary food, as milk, meat, potatoes, &c. The weaning was borne v that the appetite was rather deficient and capricious, for about a we parture of the nurse. She can stand up when placed in the erect p walk feebly when well supported, but not alone, nor can she rise up posture. Her intelligence is, in all respects, perfect, but she does n There is no vestige of her former spasmodic symptoms, when she is but any little turn of sickness reproduces some contraction of one le flexion of the hands.

Some months after this, the child was unfortunately seized with She did well for several weeks, but one day, being seized with a fit of seated upon the floor playing, died instantly, doubtless from asphy complete closure of the glottis by spasm. This is the only case of hoo we have ever known to prove suddenly fatal in this way. There is suppose that the fatal suspension of respiration was caused by the un bility of the sphincter muscle of the glottis, left by the previous att mus stridulus.

y muscles, with paroxysmal exacerbations, and usually without any
iod of complete relaxation until the close of the malady.

From this definition it will be seen that the affection does not differ
its essential nature from tetanus as it occurs in adults; though there
e so many peculiarities in its causes and symptoms as to demand a
ecial discussion. This disease has also been described under the
mes of trismus nascentium or neonatorum, in accordance with the
ominence and frequency of contraction of the muscles of the lower
w: but as the spasm is rarely limited to these muscles, but usually
volves the other muscles of the face and those of the extremities, the
ore comprehensive name of tetanus seems more appropriate. It most
equently makes its appearance between the third and tenth days
ter birth, although there are cases on record in which it set in fifteen
urs after birth (West), and others where it did not manifest itself
til the twelfth or fifteenth day.

Causes.—The causes which have been assigned for the production
tetanus nascentium are very numerous; they may, however, be
nerally divided into the groups of *general* and *local*. Among the
al causes, the various morbid conditions of the umbilicus and
bilical vessels hold the most prominent place. These are, however,
r from being constantly present, and yet the weight of evidence
at present in favor of regarding diseases of the umbilicus, and
ore especially of the umbilical arteries, as occasional causes of tetanus
scentium.

In other cases, the disease has been attributed to some blow or
cidental injury which the infant had received. It is, however, still
vexed question as to how much influence should be ascribed to
ese purely mechanical impressions in the production of this affec-
on. One of the most powerful efforts yet made to establish their im-
rtance was by Dr. Marion Sims,[1] who published a series of articles to
ove that "trismus nascentium is a disease of centric origin depend-
g on a mechanical pressure exerted on the medulla oblongata, and
s nerves; and that this pressure is the result, most generally, of an
ward displacement of the occipital bone." This displacement is
ysiological during the parturient state, but its persistence after
rth is dependent, according to his theory, chiefly upon the improper
sition in which infants are allowed to lie, resting upon their occiput
r days together.

Further experience, however, has not confirmed this view, nor justi-
ed the admission of injury to the cranial bones into the list of com-
on causes; and yet there are a few cases on record in which tetanus
ndoubtedly appears to have been developed from this source.

General Causes.—Vicissitudes of temperature appear to favor the
velopment of tetanus, since it is frequent in many countries where a
gh temperature during the day is succeeded by great cold during the

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[1] Amer. Jour. of Med. Sci., April, 1846, p. 363; July, 1848, p. 59; and October,
48, p. 355.

of all infants born to perish during the first two weeks f
alone. It was formerly supposed that certain localitie
among which are those just mentioned, were peculiarl
the development of this disease, but it is probable that
tion exists excepting the fluctuations of the climate
habits of the people.

The very great importance of filth and deficient v
cause of tetanus nascentium is, however, most forcibly
great reduction in the frequency of this disease in larg
lums, effected by the introduction of more thorough ve
greater regard to cleanliness. This was conclusively de
the Dublin Lying-in Asylum towards the close of th
Previously to the year 1782, of 17,650 infants born alive
2944, or almost one-sixth, had died within the first fo
almost every one of these the cause of death was tetan
During the next seven years, after Dr. Clarke had sim
a much more complete system of ventilation in the
children born, only 419 in all died, or about 1 in 1
cent.

Our comparative immunity in this part of America, e
poor in our cities, is probably due to the greater degre
in their houses, and to the improved construction of ou
asylums. In New York, however, according to Dr. Sm
more deaths from tetanus during the first year of life th
ages together.

The mortality returns of this city indicate that tet
comparatively frequent among infants, is much less sc
York.

Thus during the 9 years, from 1860 to 1868 inclusiv
show a total mortality (less still-born), at all ages, o

; this same period, the number of births in Philadelphia, d to 146,895.

LOGICAL APPEARANCES.—We have already alluded to the mor- litions of the umbilical vessels or umbilicus occasionally found is nascentium; it is evident, however, that if these lesions have nection with the disease, they merely act as exciting causes. nly characteristic lesions of this affection are presented by the system.

rain and its meninges are frequently found intensely congested, this is not so uniformly present as a similar condition of the ord; according to numerous observers, however, it is more fre- present than absent. In some cases, this congestion has led to l effusion of blood, either between the skull and dura mater, arachnoid cavity, or into the ventricles. In some cases, in- f hemorrhage, there has been found serous effusion into the es or into the subarachnoid space, accompanied with a diminu- consistence of the cerebral substance, as reported by Matus-

morbid appearances found in connection with the spinal cord same in character as the above, but more constant and even arked. The vessels of the spinal meninges and of the substance ord are intensely congested, and there is frequently effusion of to the cavity of the arachnoid.

alue of these appearances was formerly underestimated from a n that they might be partly, at least, due to the mere gravita- the blood after death. This suspicion has, however, been en- emoved by the observations of Weber of Kiel, and Finckh of rdt, who placed the bodies of infants dying with tetanus in va- ositions before examining them, and yet invariably found the entioned conditions.

is, however, a further source of doubt as to the significance of sions. We have already seen, in speaking of eclampsia, an af- in which no appreciable material lesion has as yet been de- that, in a certain proportion of cases, congestion, serous effusion, l hemorrhage might be present not as causes but as effects, and rely to the intense venous engorgement caused by the embar- t of the respiration and venous circulation during the convul- It is, indeed, it seems to us, highly probable that a similar etation may be placed, in many cases at least, upon the morbid nces above mentioned as being found after death from tetanus ium.

ave thus enumerated the lesions of the nervous system which dily discoverable in many fatal cases of tetanus; and yet these are, it will be observed, almost without exception concerned with the vascular supply of the brain and spinal cord, and we et without any accurate investigations into the condition of the s tissue itself. Within the past few years, the wonderful ad- of microscopical science, as applied to pathological anatomy, have revealed structural changes in the nervous system in connecti with more than one disease, whose pathology has heretofore been terly obscure, and it is not too much to hope that at no distant peri the question of the presence of any definite structural change in t brain or spinal cord in cases of tetanus nascentium will be positiv settled. In connection with this suggestion, especially in considerati of the analogy between this disease and tetanus in the adult, w append the results of the investigations of Rokitansky and Demn upon the microscopical appearances in the spinal cord in fatal cases this latter affection.[1]

1. The constant anatomical character of tetanus appears to be pr liferation of the connective tissue (of the cord); the most striking p culiarity of this lesion is the extent over which it is found.

2. The product is a viscous mass, abounding in nuclei; it remains this stage of development in both acute and chronic cases, never pr gressing to the formation of fibres.

3. This change is found almost exclusively in the white medulla substance; the gray matter seems to suffer only secondarily, and th from compression rather than interstitial deposit.

4. The proliferation is not always followed by corresponding swe ing of the white matter; it can often be recognized only by means the microscope.

5. It was principally found in the medulla oblongata, the crura cer bri, the inferior peduncles of the cerebellum, and in the greater part the spinal cord.

6. This lesion of the connective tissue appears to be due to long-co tinued or repeated congestions.

7. The period at which it occurs, probably varies in different cases

These observations, which were originally published about 1860, hav been confirmed in all essential particulars by Wagner (*Syd. Soc. Yea Book*, 1862, p. 219); and still more lately by J. Lockhart Clarke, wh published in the *Med.-Chir. Trans.*, vol. xlviii, the results of the micr scopic examination of the spinal cord in six cases of tetanus, in all which structural lesions were discovered; and by Dr. Dickinson (*Me Chir. Trans.*, vol. li, p. 265).

SYMPTOMS.—There are rarely any premonitory symptoms of the a tack, but the onset and development of the disease are usually gradu The earliest symptom noticed is, in most cases, difficulty in nursin the infant appearing anxious to nurse and eagerly pressing its mou against the nipple, but being unable to fully take it into the mouth to suck, from a rigid condition of the masseter muscles. At the sa time it utters a whimpering, whining, unnatural cry.

The tonic muscular contraction very rarely remains limited to t masseters, but soon invades the other muscles of the face, and those the trunk and extremities.

The expression of the face thus produced is indicative of great suff

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[1] Schmidt's Jahrb., vol. iii (in New Syd. Soc. Year-Book, 1864, p. 232).

though it is impossible to say how truly this represents the sensa-
s of the patient.

he face is drawn into wrinkles and furrows, and has a strange appear-
e of age. The condition of the mouth, however, is most characteris-
the jaws are firmly fixed, the lips slightly separated and pressed
ly against the gums, and the angles of the mouth drawn backwards
downwards, in the well-known risus sardonicus.

uring this time, the other voluntary muscles gradually become rigid.
first, their contraction can be overcome by the use of a moderate
ree of force, but in the course of twelve or twenty-four hours the
iod of maximum rigidity is attained. The head is drawn back-
rds, and firmly fixed; the arms are flexed, and the hands clenched,
h the thumbs drawn across the palms. The thighs may be flexed
n the pelvis, or the legs crossed; the great toes are usually ad-
ted and separated from the rest, which are flexed.

The contraction of the dorsal muscles frequently produces opisthoto-
; and the entire body is at times rendered so rigid that it can be
sed, without bending, by placing a hand under the heels and head.
is extreme degree of spasm of all the voluntary muscles may never
developed in some cases; or, when present, it often is not persistent.
hen the infant is quiet or sleeping, there is usually a certain degree
relaxation. It is a marked peculiarity of the affection, however,
t exacerbations of the tonic spasm are produced by the slightest
iting causes, as an effort at deglutition, a sudden noise, a puff of air,
most delicate touch, or even the alighting of a fly upon the surface.
ring these paroxysms or clonic spasms, the muscular rigidity and
ntraction attain their greatest height, and produce the most painful
tortion of the face and limbs. The fit, according to West, may be
hered in by a screech. During its continuance, there is serious inter-
ption of respiration and circulation; the surface becomes livid, and
istaxis may occur. It is during this condition, too, that hemorrhages
to the brain or spinal cord, or their meninges, may result.

These paroxysms recur at irregular intervals, but usually, in fatal
ses, occur with increasing frequency until either the child expires
ddenly during one of the fits, or passes into a state of coma.

The pulse does not present any characteristic change; in some cases
has been found accelerated, but in others has continued normal, or
s even fallen below the healthy rate.

The condition of the bowels is not uniform. Diarrhœa is frequently
esent, but is probably due to irritation of the bowels from the irritat-
g nature of the ingesta, or to some accidental cause; particularly as
e bowels are occasionally constipated in well-marked cases.

The appetite generally appears to continue, but we have already al-
ded to the fact that any attempts to feed the child bring on violent
asms, which expel the greater part of the food taken into the mouth.
wing principally to this obstacle to the nourishment of the infant,
e emaciation is more rapid and marked in this than in almost any
her affection of infancy.

appeared, and that there were fluctuations in the symptoms ease. The only circumstances, then, which would lead us to gloomy prognosis than usual, are the late appearance of and the mildness and intermitting character of the sympto

The *diagnosis* of this affection presents no difficulties, b made by attention to the persistent muscular contraction, t to suck or to take food, and the exacerbations which are p the slightest causes.

DURATION.—In fatal cases, the duration rarely exceeds fo seventy-two hours, and death frequently occurs during th There are instances, however, in which its course has bee to the sixth, or even the ninth day; and Smith refers to t able fatal cases, recorded by Underwood and Elsässer, in o the duration was six weeks, and in the other thirty-one da

Dr. Wells has reported (*Brit. Med. Jour.*, Dec. 21st, 1861) ing case of chronic trismus: The child died at the age of having been, from its birth, in a state of tonic spasm or tris always restless, and appeared ill nourished, though there w for this. All treatment was unavailing. It was suggest child's state might proceed from irritation due to the mo and the child was weaned, but without benefit. At the p examination, there was found a considerable opalescent e the surface of the brain; the cerebellum was harder than on being cut into presented a homogeneous appearance. Th was entirely wanting.

In favorable cases, the duration varies from a few days to or even more.

In the 8 favorable cases collected by Smith, the durati case, two days; in 1, a few days; in 1, fourteen days; in 2, f in 1, twenty-eight days; in 1, thirty-one days; and in th led to any extent, as on the Southern plantations, its progress can arrested by insisting upon the observance of cleanliness in bedding d clothing, of mother and child; by cleaning, disinfecting, and freely ntilating the houses; by care in dressing the umbilical cord; and, nally, by attention to the food of the infant, and the condition of its owels.

Even when the disease has made its appearance, these same measures ould be carried out with equal care, since by removing all possible uses, so far as we are acquainted with them, we may mitigate the verity of the attack.

In addition to the removal of the causes, the strictest quiet should e enjoined, and all care employed to avoid exciting the violent par-xysms, which are so readily induced.

It would be well, in addition, to examine the occipital region, to dis-over if the occipital bone be unnaturally depressed, since in one or two ases this has appeared to act as the exciting cause of the attack. If uch depression be found, the position of the child should be varied by lacing it on its side, in accordance with the recommendation of Dr. ims.

The application of leeches to the nape of the neck or along the spine, ppears indicated in the early stage of the disease. Dr. West advises he practice, though he has had no experience in its use. Collins, how-ver, states he has tried frequent leeching along the spinal column, without the least benefit.

Purgatives are only useful to the extent of maintaining regular ction of the bowels.

The remedies which have been most highly recommended as directly urative, are ether and chloroform, and various narcotics and antispas-modics, as opium, hydrate of chloral, belladonna, aconite, cannabis In-dica, conium, woorara, tobacco, and assafœtida.

Anæsthetics have been employed frequently in tetanus of the adult, and occasionally in the affection under discussion. Despite, however, the great expectations which were entertained in regard to their utility, their action cannot be considered directly curative. They re-lieve suffering, however, and by temporarily allaying the spasmodic contraction of the muscles, enable us to administer food or remedies, and thus prolong life, and give time for other agents to act. "So long, therefore, as the patient is able to take food and to obtain periods of comparative quiet, the use of anæsthetic inhalations is not desirable. Great advantages may, however, be obtained from them if he be unable to open the jaw sufficiently to permit of taking food, or if the tetanic spasms are without remission. Ether appears to have stronger facts in its recommendation than chloroform." (J. Hughlings Jackson and Hut-chinson's Report on Tetanus, *Med. Times and Gaz.*, April 6th, 1861.)

The evidence in regard to the superior efficacy of any particular nar-cotic, is highly conflicting. Opium has, until recently, been the one usually relied upon, and several recoveries have occurred under its use. Of late years, however, various other narcotics have been employed,

nascentium under this treatment; in one of which the i
eight days, took as much as f℥ss. of tincture of cannabis
single day—being equivalent to about eleven grains of th
tract. This quantity, however, appears excessive.

Woorara has been given in twenty-two cases, according
with eight cures. It has been recommended by Harley, Spe
Broca, Vella, Chassaignac, and others. The dose in which
ous substance has been given, is from one-eighth to one-half a
adult. The great objection, however, to both this remedy an
Indica, is the great want of uniformity in the strength of t
rations, which necessitates the utmost caution in their use.

More recently still, numerous cases of tetanus in the adult
treated with the various preparations of conium, and with
conia, and also with hydrate of chloral, and the results hav
decidedly encouraging character.

Among the antispasmodics most frequently used, are assa
tobacco, either given internally or by enema, or added to a
There is no very positive evidence, however, of their effici
disease.

Baths, either of warm water or vapor, should be repeat
they tend to act favorably as sedatives, by relaxing the musc
and, in addition, excite the action of the skin.

The free use of large doses of quinine, usually in combin
one of the narcotics above mentioned, appears to be servicea
matic tetanus, by reducing the frequency of the pulse and
the tendency to spasm, so that the induction of cinchonism
nascentium is a measure worthy of a fair trial.

The application of ice to the spine has been highly recom
tetanus in adults, and is reported to have been used with
several cases. The condition of the bloodvessels of the c
membranes, in fatal cases of tetanus nascentium, would certai

m taking food, we should have recourse to anæsthetics to relax the smodic muscular contraction, and enable us to get nourishment into stomach.

ARTICLE X.

CHOREA.

DEFINITION; SYNONYMS; FREQUENCY.—Chorea is a non-febrile, con- lsive disease, characterized by irregular and imperfectly co-ordinated, t not completely involuntary contractions, of different parts of the scular system, and particularly of the muscles of the face and of e extremities.

It is called also St. Vitus's dance, chorea sancti viti, choreomania, ilepsia saltatoria, and by various other titles.

It is evidently impossible at present to determine the frequency of orea, as it rarely proves fatal, and consequently scarcely figures in e mortality reports. It must, however, be quite frequent, since it rely happens to us not to have several cases under treatment at any e time, either in private practice or in some public institution. M. ufz states (*Dict. de Méd.*, t. vii, p. 544), that of 32,976 children admit- d into the Children's Hospital of Paris in ten years, only 189 were fected with chorea, or 1 in 377.

PREDISPOSING CAUSES.—*Age.*—Chorea very rarely occurs during in- ncy. According to M. Rufz, it is seldom met with between one and x years of age, since of 189 cases, in only ten did it occur within that riod; while between six and ten years of age it is much more com- on (61 in 189 cases); and between ten and fifteen years still more so 118 in 189).

M. Sée, in a valuable essay on chorea (*Mém. de l'Acad. Nat. de Médé- ne*, t. xv, p. 373), and the relations of rheumatism and diseases of the eart with nervous and convulsive diseases, states (page 448), that of 31 cases of chorea treated in the Children's Hospital at Paris, during period of twenty-two years, 28 were under six years, 218 between x and ten years, and 235 between six and fifteen years of age. M. ée concludes, after carefully sifting the facts, that the true maximum f frequency is comprised between six and eleven years of age, and that corresponds especially to the tenth year. Under six years of age it ecomes more and more rare as we approach the moment of birth. MM. imon and Constant, however, met with it in nursing children of twelve, x, and four months of age.

The statistics furnished by Hillier[1] confirm these statements in every tail. Thus, of 422 cases treated as out-patients at the Children's Hospital in London (where no patients over twelve years are received), the numbers at different ages were as follows:

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[1] Diseases of Children (Amer. ed., 1868, p. 234).

From	3 months	to	6 months,	.	3		From	6 years	to	7 years,		.	48
"	6 "		12 "	.	5		"	7 "		8 "		.	51
"	12 "		18 "	.	2		"	8 "		9 "		.	58
"	18 "		2 years,	.	4		"	9 "		10 "		.	80
"	2 years		3 "	.	6		"	10 "		12 "		.	104
"	3 "		4 "	.	11								—
"	4 "		5 "	.	20								422
"	5 "		6 "	.	30								

Sex.—It is much more frequent in girls than boys. Of the 531 cases cited by M. Sée, 393 occurred in girls, and only 138 in boys. This is the same result as that attained, M. Sée remarks, by Reeves, Good, &c., —131 girls in 186 cases. This accords entirely with our own experience, and in a very interesting statistical report by Dr. George S. Gerhard, based on 30 cases observed in this city (*Phila. Med. Times*, 1873, vol. 2), the number of female patients just doubles that of the males, 20 to 10.

This excess of females over males obtains in chorea of every grade from the mildest to the most rapidly fatal cases.

Rapid growth and the *second dentition* probably act, in a considerable degree, as predisposing causes of the disease. Particular attention is drawn to these conditions by MM. Rilliet and Barthez, and the precise age at which it is most frequent (between six and eleven years), would seem to show that they exert a very positive influence. The general deterioration of the health, resulting in anæmia, and the exaggerated nervous susceptibility, so often observed at these periods, are probably the immediate causes of the frequency of the disease at this epoch of life.

Drs. Gerhard (*loc. cit.*) and S. Weir Mitchell report that they have observed that chorea occurs more frequently and in a more severe form in the spring than at any other season; and also that relapses of the disease are most apt to take place at that time. They think this is probably attributable to the condition of weakness of the system, which exists in the spring.

An altered and anæmic state of the blood has also been supposed, as by Ogle[1] and Barnes,[2] to be the efficient and exciting cause of the affection. Rilliet and Barthez,[3] also, when speaking of rheumatism as a cause of chorea, say that, "while admitting the existence of rheumatic chorea, it must not be forgotten that the disease is frequently of a different nature, and that we meet in authors with incontestable examples of chorea consecutive to chronic diseases that have produced a debilitated condition of the economy, . . . as chlorosis, anæmia, and tuberculosis."

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[1] Brit. and For. Med.-Chir. Rev., Jan. and April, 1868, pp. 208, 465.

[2] Chorea in Pregnancy. Proc. of Obstet. Soc. of London, vol. x, 1868, p. 147.

[3] Op. cit., 2ème ed., t. ii, pp. 565–598.

Constitution does not seem to exert much influence in its production, ough it is generally thought to be most apt to occur in children of licate, excitable, and nervous temperament. The belief in *hereditary* redisposition seems to be unfounded save in rare cases. The disease ppears to commence more frequently in spring and summer than in inter, and yet it is scarcely known in tropical climates.

Rheumatism, however, is unquestionably the condition in connection ith which chorea occurs far more frequently than with any other, or erhaps than with all others conjoined. The evidence of all observers experience is unanimous upon this point. M. Sée (*loc. cit.*) asserts, ter much examination of this subject, that one-half the cases of chorea e dependent upon the rheumatic poison. Thus of 109 cases of rheuatism admitted into the Hôpital des Enfants, he found that 61 were mplicated with chorea. Trousseau[1] also states that in his experience eumatism was undoubtedly the most marked cause of chorea. M. enri Roger[2] asserts their connection even more strongly, and states at "the coincidence of chorea and rheumatism is so common a fact at it ought to be regarded as a pathological law, just as much as the incidence of heart disease and rheumatism."

In England, also, this connection between rheumatism and chorea, th of the mild and severe or fatal form, is positively stated by numers authorities. Thus in 104 cases of the list collected by Dr. Hughes,[3] where special inquiries were made respecting rheumatic and heart fections, there were only 15 in which the patients were both free from rdiac murmur, and had not suffered from a previous attack of rheuatism." Hillier (*op. cit.*, p. 236) "believes there is a very close conection between these diseases." West (*op. cit.*, 4th Am. ed., p. 188) ays: "Be the exact relation then what it may, it does seem that rheuatism, or the rheumatic diathesis, is a very powerful predisposing ause of chorea." Dr. H. M. Tuckwell, in a valuable article[4] on the athology of chorea, strongly upholds their frequent connection, and tes 17 cases of his own, in 11 of which the previous occurrence of eumatism was allowed, while it was denied only in 6.

Dr. Chambers found that out of 33 cases of chorea in his books, in 6 e affection either began during rheumatic fever, or followed immeditely after it, or else rheumatic fever succeeded to the chorea. In 80 ases of non-fatal chorea recorded by Ogle,[5] it appears that in 8 cases heumatic fever had existed.

On the other hand, several German authors of high authority do not ttach so much importance to the causative influence of rheumatism in horea. Thus Romberg[6] states that he has not observed their connection frequently; and Vogel[1] states that, "although it must be acknowledged that chorea may succeed to acute rheumatism, still the frequency of the occurrence has been very much overestimated."

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[1] Clin. Med., 2ème ed., t. ii, pp. 160–198.

[2] Arch. Gén. de Méd., 1866, vol. ii, p. 641; and 1867, vol. i, p. 54; and Gaz. Méd. Paris, March 7, 1868.

[3] Guy's Hospital Rep., 2d series, vol. iv, 1846.

[4] St. Barth. Hosp. Rep., vol. v, 1869, pp. 86–105.

[5] Brit. and For. Med.-Chir. Rev., April, 1868, p. 490.

[6] Dis. of Nerv. Syst. (Syd. Soc.), 1853, vol. ii, p. 57.

Steiner[2] also states that out of 252 cases of chorea the disease ensued during the decline of acute articular rheumatism in but 4 cases; of [illegible] fatal cases, however, reported by him, one was complicated with rheumatic heart disease.

We must also allude to the argument of Vogel (*op. cit.*, p. 399), that if there were any actual connection between these diseases, then more girls than boys ought to suffer from rheumatism; for it is well known that the former are predominantly subject to chorea. "Just the reverse happens to be the case in rheumatism, which notoriously attacks more boys than girls." We have already quoted extensive statistics which prove the truth of the first of Vogel's statements; but we are by no means convinced that the latter is correct, and that rheumatism is more frequent in boys than in girls. On the contrary, the statistics quoted by Tuckwell (*loc. cit.*, p. 102) go to show that the reverse even may be the case. Thus during sixteen years there were admitted to the Children's Hospital in London 478 patients with rheumatism, [illegible] of whom were females, and 226 males.

We are not aware of the existence of any accurate statistics of the disease in this country in regard to this point, excepting those of Gerhard (*loc. cit.*), in whose 30 cases rheumatism was assigned as the cause in only 4.

The great weight of evidence, however, which has been accumulated in favor of such a connection, together with the decided results of our own observation, appears to us to leave no doubt that in a considerable proportion of cases, though by no means in all, chorea in some way depends upon the existence of rheumatism, or the rheumatic diathesis. We shall have occasion to call attention to the obscurity which frequently attends the manifestations of rheumatism in young children; and it is, therefore, highly probable that in not a few cases of chorea where, on inquiry, the parents deny the previous occurrence of rheumatism, the truly rheumatic nature of some acute febrile attack, with which the child may have suffered months before, has been entirely overlooked.

We will postpone, until we come to discuss the nature of this affection, the consideration of the manner in which rheumatism disposes to chorea, whether by directly causing centric lesions, as of the spinal meninges; or by inducing a state of anæmia, impaired nutrition, and preternatural mobility of the nervous system; or whether the choreic movements are in some way connected with cardiac disease, which [illegible] frequently attends rheumatism in the young.

Exciting Causes.—Of many exciting causes that have been men ned by different writers, the one most frequent and most clearly oven, is the influence of terror. It was assigned as a cause in 31 out 56 cases collected by Duffosse and Bird, in 34 out of 100 cases col- ted by Hughes, in 25 out of 128 by Sée, in 9 out of 31 by Peacock, 9 out of 38 by Hillier, and in 7 out of 30 by Gerhard. Besides this cited imitation, blows and falls upon the head, fits of violent anger, trarieties, prolonged excessive mental effort in young subjects, mas- bation, the difficult establishment of the menstrual function in girls, suppression of that function, the sudden drying up of ulcers or erup- ns, and, in females after puberty, pregnancy, which indeed is a well- ertained and most important cause.

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[1] Op. cit., p. 399.

[2] Prag. Vjrschr. xcix (xxv, 3), p. 43, 1868; in Schmidt's Jahrb., Bd. 142, 1869, p. 26.

Chorea has also been observed in the course of, or as a sequel to, ious acute diseases, as pneumonia, the eruptive, typhoid, and inter- tent fevers, and affections of the gastro-intestinal tube.

ANATOMICAL LESIONS.—It would appear that as yet we are unac- inted with any truly characteristic lesion in chorea. In many of recorded autopsies, it is stated that no lesion either of the cerebro- nal axis or any other viscus was present. As, however, most of se autopsies were made before the improved methods of microscopic amination of the nervous system were introduced, they cannot be garded as conclusive upon this point. In many cases, also, the ex- ination of other viscera has been too superficial to have led to the tection of minute but positive and important lesions. Upon the ole, therefore, it may be fairly said, that it is chiefly the examina- ns which have been made during the past few years which are of l value, and that there is still need of numerous accurate autopsies fore we can consider ourselves justified in speaking of the true lesions chorea.

It is evident that the determination of this question presents great culties, apart from the fact that fatal cases of chorea are compara- ely rare, and that it requires an amount of skill and patient labor, rely at command, to make the examination with the requisite mi- teness. One of these difficulties consists in the fact that, although orea may exist as a special, individual affection, there are numerous her cases of nervous disease which are of very varied nature, but hich are attended with irregular muscular movements truly choreic character.

We think it highly probable, therefore, that all cases of so-called orea will never be found to be invariably associated with any one atomical lesion.

Thus, passing to the actual results of post-mortem examination, we d a number of lesions recorded which evidently refer to cases of or- nic disease of the nervous centres, which were merely attended with oreoid symptoms.

Among these are enlargement of the odontoid process, effusions into e arachnoid, tumors in the substance of the brain, abscess in the cere- llum, bony plates upon the spinal meninges, and many other entirely connected lesions.

On the other hand there are cases on record, in which careful exa nation has failed entirely to detect any material lesion, either of th nervous centres or of the other viscera, and in which the choreic mov ments were probably of a reflex character.

Of late years, however, since this question has been subjected more frequent and critical examination, there are certain lesions wh have been found so frequently after death in fatal cases of true cho that they must be regarded as possessing some definite connection w the disease. These lesions consist in certain morbid conditions of th heart, and of the nervous centres.

In regard to the lesions of the *heart*, M. Sée (*loc. cit.*, p. 390) sta after a careful examination of eighty-four autopsies, that "in mos the cases, and especially in those most strongly attested, chorea is th result of the rheumatic diathesis, and that it reveals itself by pl inflammations of the cardiac membranes, of the pleura, and of the pe toneum, with or without articular rheumatism."

Bright, Copland, Todd,[1] Kirkes,[2] Nairne,[3] Begbie,[4] were also am the first to call attention to the frequency of rheumatic endocarditis connection with chorea. In an interesting article on "Maniacal Chorea Tuckwell gives an analysis of the lesions in 34 fatal cases of chorea lected by himself. In 25 of these the endocardium was found dise the presence of warty vegetations on the valves being especially all to in 20. Of the remaining 9, no mention is made of the heart i and it is reported as healthy only in 4. The pericardium was fou diseased only in 8 of the 34 cases.

In Ogle's fatal cases (*loc. cit.*, pp. 208 and 507), there were in 11 of 17 instances more or less fibrinous deposit or granulations upon valves or some part of the endocardium. In 2 cases only was the pe cardium diseased. In the 14 fatal cases collected by Hughes (*loc. c* vegetations were found on the valves of the heart in not less than 11

The results of careful auscultation, during life, come to support th of post-mortem examination.

Hillier states (*op. cit.*, p. 236) that, "of 37 cases in my note-bo there was probably organic disease of the heart in 25, and in 4 oth there was evidence of functional derangement, whilst in 8 only wa there no sign of cardiac disturbance."

Jules Simon writes from a large experience, and says: "I have been most always able to detect well-marked evidence of cardiac affection chorea, in the shape of organic murmurs, hypertrophy of the heart, &c.

In our own experience, evidences of rheumatic heart disease ha very frequently been present in cases of chorea; and also in cases wh have come under our care for organic disease of the heart, there ha frequently been a history of previous attacks of chorea.

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[1] Lumleian Lectures, 1849.

[2] Medical Gazette, 1850.

[3] London Jour. of Med., 1851.

[4] Edin. Med. Jour., 1852.

[5] Brit. and For. Med.-Chir. Rev., Oct. 1867.

[6] Nouv. Dict. de Méd. et de Chir. Prat. Art. Chorée (quoted by Tuckw Barth. Hosp. Rep., loc. cit., p. 101).

sufficiently evident, therefore, that in a large proportion of
chorea, some morbid condition of the endocardium is present.
ticular lesion which has been usually found, consists of fine
e vegetations, which either fringe the border of the mitral
r are seated upon the auricular surface of its leaflets.

vegetations are in most cases readily detached from the valve,
ly brushing them with the tip of the finger, or with a camel's-
sh; and it has been supposed by some observers, as Ogle and
that they consisted merely of the fibrin of the blood, deposited
gony of dissolution. We believe, however, both from the pre-
currence of valvular murmurs in cases where such vegetations
en found, as well as from a careful study of the anatomical de-
ns of their appearances, and the occasional presence of the posi-
ults of embolism, that these vegetations are produced by a pro-
endocarditis.

will, however, discuss the question of their connection with
when we come to speak of the nature of that disease.

gard to the condition of the nervous system in fatal cases of
there is at times no lesion appreciable, even on microscopic ex-
on, while on the other hand there is not unfrequently marked
either of the nervous tissue or of the meninges.

in the 14 fatal cases collected by Hughes, the *brain* was healthy
ly congested in 3 cases; there was softening of the brain, with
out opacity of the membranes and serous effusion in 6, and in
enth with opacity and congestion of the dura mater.

of the 35 fatal cases collected by Tuckwell, the brain was found
l, and in 9 only is it reported as healthy. In the 16 fatal cases
d by Ogle, the brain was healthy in 6, much congested in 8, soft-
but 1, and anæmic in 1 also.

pears, therefore, that in a notable proportion of the cases upon
positive organic disease of the brain, and especially in the form
ning, has been discovered. In a few instances embolism, or
n of the vessels by fibrinous masses, has been observed, either
arotid artery (Ogle), or in the minute arterial branches leading
hes of softened brain-tissue (Tuckwell). We need, however, a
ries of careful observations to determine more positively how
tly lesions of the brain occur, and especially in what proportion
s embolism is present.

spinal cord has also been found softened with or without opacity
ckening of its membranes, though in a much smaller number of
robably in part because it has not been so frequently examined
cases as the brain.

e 16 fatal cases reported by Ogle, its tissue was congested in 5;
as slight softening in 2; in 1 the upper dorsal region of the cord
npletely broken down and almost diffluent. In 2 cases the cord
mined by Mr. J. Lockhart Clarke, who found in one (*loc. cit.*, p.
t "in the lower part of the dorsal region, at the ninth dorsal
the anterior columns were swollen, and formed a convex protu-

maniacal chorea in a lad of seventeen years of age, in
eral patches of embolic softening of the brain, there w
ening of the spinal cord in the middle dorsal region.

In 3 fatal cases reported by Steiner (*loc. cit.*), there
the connective tissue of the spinal cord; serous effusio
canal; and congestion or effusion of blood in the me
exit of the nerves.

Finally, in the cases where embolism of the brain w
Tuckwell, there was also minute embolism of the *kidne*

In a case of fatal chorea reported by Monckton,[1] e
brachial artery occurred, and, after death, large vegetati
on the aortic valves.

We will have occasion to refer again to these various
pearances when speaking of the nature of chorea.

SYMPTOMS; COURSE; DURATION.—The disease may be
tial: in the first case, it affects all the limbs, the face, a
muscles of the trunk; in the second it implicates on
upper extremities, a single member, or a certain group
happens not rarely that the choreic movements are lim
of the body: thus in 80 cases of non-fatal chorea report
cit., p. 488), the right side alone was affected in 24, whil
was affected in 20; and in 25 both sides were affected,
instances one or the other side was more involved th
one. Of the 30 cases reported by Gerhard (*loc. cit.*),
were strictly unilateral, the choreic movements being
right side in 10 instances, and in 5 to the left. In a la
the recorded cases of unilateral chorea, the right side
one. It occasionally happens, as noted by Russell (*Med*
zette, 1868 and 1869) and Gerhard (*loc. cit.*), that a ch
gins as unilateral, may subsequently invade the op
become general. Of 7 cases that we have seen, in w

ntioned with any authority are irritability and peevishness of per, an unusual degree of impressibility, languor, debility, dis- of the organic functions, exhibited by deranged appetite and ular state of the bowels, and, after a time, a certain quickness gularity of the movements, which mark the commencement of racteristic symptoms of the malady.

ion.—The onset of the disease is, as already stated, either sud- gradual, so that there may be several days or more before it any considerable degree of severity, or it may, particularly he case has been of a sudden and energetic nature, reach its in a few hours. In most cases, however, it begins with some and singular movements in one of the upper extremities. The movements are often observed first in the fingers, and at the me or soon after, in the face. Sooner or later they increase in r, and extend to the other arm, to the legs, and to the tongue, disease is fully developed.

toms of Confirmed General Chorea.—When the disease has be- lly confirmed the movements are exceedingly diversified and ar. The limbs are agitated by involuntary contractions of the into every attitude possible for them to assume. The fingers ned and shut, brought together or separated, without any regu- The hands are flexed and extended upon the forearms, or pro- nd supinated, whilst the forearms are flexed or extended upon ns, and the arms moved at the shoulders into every imaginable . Such are the irregularity and rapidity of the motions that it with great difficulty that the patient can seize anything with ds, and when once the object is attained, he frequently cannot it what he wishes. This imperfect control over the hands and metimes prevents the patient from carrying food and drink to uth, excepting with the utmost difficulty, and may make it neces- feed the child.

inferior extremities are affected in the same way as the arms. g is always more or less difficult, and in some severe cases im- able. The patient totters from side to side, or walks rapidly a istance, and then suddenly stops. Sometimes the progress is lished in a zigzag direction, and at others by fits and starts as whilst in others again, the walk is rapid and sudden, almost a The child often falls while walking or running, either from meet- ight obstacle, or in consequence of the irregular and imperfect ar action. In some instances standing is impossible, the knees suddenly under the weight of the body. It was no doubt the r irregular and dancing movements of the inferior extremities the attempts to walk and stand, that gave to the disease its name of St. Vitus's dance.

convulsive movements of the face and head are not less singular ose of the limbs. The face is distorted into all kinds of expres- o that it assumes by turns that of the most opposite emotions, ess, terror, joy, or grief. The mouth is opened and shut, or its

often very violent muscular contractions do not seem to occa-
ue.

s, however, frequently evidence of a want of muscular power,
ay merely amount to an unusual susceptibility to fatigue on
r exertion; or complete paralysis may be present, especially in
of hemiplegia, in cases of unilateral chorea. This latter is by
nost frequent form of palsy in choreic patients, according to
observation. It occurred in no less than 7 of Gerhard's 30
1 5 times on the right side, and in 2 upon the left.

eneral symptoms require some attention. The choreic move-
e almost always increased by emotion, as terror, anger, con-
s, and by the consciousness of being observed. Sleep generally
them entirely. In very bad cases they are said to produce in-
or to wake the child frequently in the night. The intelligence
affected, except in very severe and long-continued attacks;
some authors appear to have met with frequent instances of
ent or perversion of the intellectual faculties. It is said that
apt to occur in cases which last for a number of years. The
s often irritable and capricious. General and special sensibility
ly remain natural; though in some cases, impairment of general
y of the parts most convulsed, even amounting to anæsthesia,
d. In simple, uncomplicated attacks, the pulse, as a rule, re-
atural: the appetite is preserved; there is no unusual thirst,
bowels continue regular.

ine has at times been observed to be of unusually high specific
and to contain an excess of urates and oxalates. These con-
o not, however, appear to be at all constant or characteristic.

onsiderable proportion of cases of chorea (see statistics on page
ruit is heard on ausculting the heart, usually of low pitch, and
great intensity. In some cases this is undoubtedly due to the
ons so frequently found on the valves of the heart in this dis-
in others it appears to be rather due to the anæmic state of
l: and in those cases where palpitation exists, it may be due
regular contractions of the walls of the heart. It has also been
that these murmurs in chorea are often transitory, and even
ting.

urse of the disease is acute or chronic. In a large majority of
s acute, the symptoms becoming more and more violent until
ch their height, when they remain stationary for a time, and
side and disappear under the influence of treatment, or in the
course of the malady. It has been frequently noticed that
acute febrile or inflammatory disease is developed during the
f chorea, the spasmodic movements are very apt to diminish or
cease for the time. In fatal cases the symptoms are constantly
ted; the movements become so violent as to make it necessary
the child in bed, or in a strait-jacket; the patients, deprived
become feeble and emaciated; the respiration becomes diffi-
elligence is abolished; the pupils are contracted; and the child

case in particular, the relapse was one of the most violent
attacks that we have seen. MM. Rilliet and Barthez state
in six out of nineteen cases seen by them. The relapses
occurred once, twice, and three times. M. Sée (*loc. cit*
that it is not uncommon, after some weeks of respite, or s
of apparent recovery, to see the disease reappear with rene
and be thus repeated twice, thrice, and even seven times
Out of four patients, at least one, he states, remains thus
fluence of the disease. Of 158 cases he counted 37 relaps
were arrested after the second attack; 13 suffered a third,
attack; and, lastly, one had seven distinct seizures, each
was separated from the following by a well-marked in
of Ogle's cases in which this point was noted, previou
occurred in 25; in 5 of which there had been 2 previou
in 1 no less than 7. According to Gerhard, relapses, lik
attacks, occur most frequently in spring.

NATURE OF CHOREA.—In considering the essential nat
it is evident that there are two points of importance to
namely, the precise portion of the nervous system inv
nature of the morbid change in this part.

Before alluding to the views which have been enterta
to the first of these questions, we would refer to the ver
larity which exists in different cases in the extent and
the choreic movements. Thus it frequently happens tha
strictly confined to one or the other side of the body, or
tirely symmetrical. In other cases the muscles of the
may almost or quite escape, while both legs and one or
affected. Or, on the other hand, the choreic movement
pear and remain most severe in the muscles of the fa
tongue. It seems probable to us, therefore, that there is

to the extremities and symmetrical, this supposition may be

e vast majority of cases, however, it is undoubtedly necessary to the seat of disturbance in chorea at a higher point in the cerebro. axis, one above the decussation of the anterior pyramids, and ly in or near the corpora striata. Among the arguments which this view, many of which have been advanced by J. Hughlings n[1] and Broadbent,[2] who strongly uphold it, may be stated the ng: That the muscles of the face are very frequently affected by oreic movements; that in the great majority of cases the movecease during sleep; that the affection is frequently limited to one the face and body, and that the spasmodic movements not rarely ate in complete hemiplegia. In a footnote (*loc. cit.*, p. 93) Tuckys: "It is just to Dr. Todd's memory to add, that he long ago *t*, 1843, vol. ii, p. 463) showed that the choreic phenomena cannot lained by the hypothesis which refers them to irritation of the cord. He says: 'The hemiplegic tendency is utterly inexplicaording to that view. The affection of one-half the body would efer to some point above the decussation of the pyramids as the irritation.'" The supposition of Carpenter and others that the llum is the seat of the disturbance in chorea, was based upon the hat that organ possessed the chief power of co-ordinating muscuvements. Recent researches into the functions of the cerebellum, as the arguments which have been adduced above, render this ition untenable.

further question now remains as to the condition into which the d part of the motor centres is brought, in order to produce the nena of chorea. And it is especially in regard to this point that estigations of Jackson and Broadbent, above referred to, are of h value. These pathologists, and particularly the latter, have attention to the fact that the choreic phenomena are symptomatic of the seat of the disease, and that the only essential condition r production is an impairment of vigor and instability of the i-motor ganglia, a condition which may probably be induced in nt ways.

are now prepared to consider the manner in which the various of chorea may be supposed to act.

have already seen that in a certain number of cases chorea is inlent of any appreciable lesion of the nervous system. In some se cases it is possible that the impaired nutrition of the motor may result from an altered and anæmic state of the blood; and, , it appears to us quite as reasonable to explain a certain class es of chorea in this manner, as to apply the same explanation to ous cases of paralysis.

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nolds's Syst. of Med., Art. Chorea, vol. ii, p. 127, footnote; and Med. Times z., March 6th, 1869.

tish Med. Jour., 1869.

such movements, being affected by reflex action.

It is probable that if this mode of production be admitted
to explain a large number of cases of chorea, both where
irritation is at a distance (as in cases of pregnancy, or wh
worms in the intestinal canal or, as we have known in one
a splinter was lodged in the matrix under a finger-nail) an
seated in immediate connection with the nervous centres.
of the latter kind, may be suggested such conditions as t
the meninges of the brain or spinal cord, and the prese
spiculæ developed in the meninges.

Finally, we must admit as a cause of chorea, primary a
the tissue of the sensori-motor ganglia and adjacent parts
of disease not being so great as to abolish entirely their f
produce paralysis, but only sufficient (as for instance woul
by an early stage of softening) to weaken it and render it

It will be seen from the foregoing remarks that we dee
ble, at least in the present state of our knowledge upon th
consider the cause and mode of production essentially the
cases of chorea, and that we are disposed to admit the
cases due to mere anæmia and impaired nutrition, or t
state of the blood; of cases due to reflex irritation, in bo
classes of cases, some minute and as yet inappreciable
exist; as well as of cases which are due to primary materi
of the sensori-motor ganglia.

We have already, in considering the causes and anatom
ances of chorea, had occasion to dwell upon the close conn
exists between it and rheumatism, and before leaving the
ject it is desirable to refer to the various explanations whi
offered of this circumstance. Among these, the most im
interesting is that of Kirkes,[2] who, noticing the frequent
vegetations upon the valves of the heart in fatal cases of

(*loc. cit.*), by Savory,[1] by Tuckwell (*loc. cit.*), and, in part at least, Broadbent (*loc. cit.*).

t is supported strongly by the facts that continued observation of es of chorea has shown even more clearly the very frequent exist- e of cardiac murmurs during life, and of vegetations upon the valves er death; that complete paralysis, usually in the form of hemiplegia, quently follows the choreic movements; that in many fatal cases ere is found just such cerebral softening as follows embolism; and, ally, that in a few cases, already referred to, the existence of embol- n has been actually demonstrated.

There have, however, been numerous objections advanced against is theory, the most powerful of which are urged by Barnes (*loc. cit.*) d Ogle (*loc. cit.*). Thus it has been objected that, on the supposition numerous minute fragments of fibrin circulating in the blood and be- ming impacted in the minute capillaries, it would be difficult to ex- ain the fact that chorea is so frequently unilateral, or even localized in single group of muscles. It must be remembered, however, in answer this, not only that in some cases of fatal chorea embolism of single rge arterial branches has been found, but that the number of minute agments of fibrin detached from the heart's valves may be very small, d that it is quite supposable that they should in some instances nearly pass into the innominate, or the left carotid artery, and thus be chiefly stributed to one side of the brain. It may be mentioned also in this nnection, that it is especially in these cases of unilateral chorea that e affection is succeeded by paralysis, such as might readily follow in se of embolism.

Again, it has been objected that if chorea be invariably dependent pon embolism, the results of this accident must be of a very transient d trifling character, since in so great a majority of cases the disease rminates in complete and permanent recovery. The weight of this bjection must be admitted, and yet Tuckwell fairly remarks in answer it, that the "mere fact of recovery is not enough to condemn the otion of embolism. On the other hand, the very frequent presence of cardiac murmur, even in the milder attacks of chorea which recover, ould rather dispose me to look for the same exciting cause in the mild s in the severe cases, viz., embolism." It is evident also that if the pposed embolus were minute, and therefore obstructed only a very mall vessel, a collateral circulation might soon be established and re- tore the nutrition of the area affected.

Another objection advanced by Ogle (*loc. cit.*, p. 232) is, that in other ases of capillary embolism the symptoms produced are not those of horea, but rather of pyæmia or of gangrene. It is quite evident, how- ver, that these symptoms alluded to (which are met with for instance n ulcerative endocarditis) are due, as remarked by Savory and Tuck- ell, not to the mere capillary embolism, but to the concomitant septic ondition of the blood. In this connection, reference may be made to he elaborate experiments of Panum as to the results of embolism (*Arch.*

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[1] St. Barth. Hosp. Rep., vol. i, 1865, p. 107.

f. Path. Anat., xxv, 308, 433; *Syd. Soc. Year-Book*, 1863, p. 211), in whi he demonstrates that embolism of the vessels of the brain and medu oblongata is followed by tetanic symptoms.

This extremely interesting question cannot be considered as definite settled; there is still needed a series of careful examinations in rega to the various points under discussion. It appears to us, however, co clusively shown that, in a certain number of cases, the peculiar irrit tion and impaired nutrition of the sensori-motor ganglia, which lea to the development of the choreic phenomena, are due to embolism the vessels supplying these parts. We have, however, already e pressed our opinion that, at present at least, there must be admitte two other classes of cases of chorea, due primarily to alterations in th blood and to reflex irritation respectively. It is quite possible, ther fore, that in some instances rheumatism induces chorea indirectl either by causing anæmia and impaired nervous vigor, or by causin inflammatory lesions, as of the spinal meninges or sheaths of spin nerves, which may serve as the foci of reflex irritation.

Diagnosis.—The diagnosis of chorea cannot be attended with an difficulty, and we shall therefore make no remarks upon it.

Prognosis.—Idiopathic simple chorea in young children is rarely fatal disease. Nevertheless, even under these circumstances, it som times terminates fatally, and usually from exhaustion. Thus M Rufz, Legendre, and Rilliet and Barthez have each met with an i stance. M. Sée (*loc. cit.*, p. 406) states that of 158 cases, 4 passed in the chronic condition, and 9 proved fatal. Dr. Copland states that has met with 3 or 4 fatal cases, that Dr. Prichard has recorded 4, a that Dr. Brown refers to 3 in his practice; but he does not inform whether they were idiopathic, complicated, or symptomatic. We ha already referred to the list of 14 fatal cases, of which the autopsi were reported by Dr. Hughes (*loc. cit.*); and to the 34 additional fat cases collected by Tuckwell (*loc. cit.*). Dr. J. W. Ogle has lately (*Br and For. Med.-Chir. Rev.*, January and April, 1868) published the d tails of 19 more fatal cases; and from the same source we quote the follo ing table as exhibiting the mortality from this disease in Great Brita during 23 years.

	Deaths from Chorea.		Deaths from Cho
1839,	54	1855,	69
1840,	25	1856,	59
1841,	28	1857,	44
1842,	19	1858,	53
1847,	39	1859,	55
1848,	38	1860,	66
1849,	34	1861,	71
1850,	60	1862,	62
1851,	77	1863,	63
1852,	73	1864,	73
1853,	67	1865,	88
1854,	48	Total during 23 years, 1255.	

It is quite possible, however, that many cases of organic disease the nervous system merely attended with irregular choreoid muscu vements have been included in these reports. On the other hand, of 84,332 deaths at all ages occurring in this city during seven con- utive years, but 3 are attributed to chorea. It must not, however, think, be positively inferred from this that severe and fatal chorea s been really so rare among us; since, during the same time, there reported in addition to the deaths from convulsions, 79 deaths from amps, a vague and most improper term, which, in all probability, in- des a certain proportion of cases of chorea.

In regard to any special rules in prognosis to be deduced from a study the fatal cases, it may be observed that their average age is consid- ably greater than that of ordinary mild chorea. Thus in 17 out of gle's 19 fatal cases, but two were under the age of ten; the average ing 15⅘ths years.

So too in 32 of Tuckwell's 34 fatal cases, 21 were at or above the age fourteen, and 6 of this 21 were at or above the age of twenty.

The duration of the case scarcely seems to have a direct bearing upon fatality. It is true that in cases which have passed into the chronic rm and persisted for several months, the prospect of being able to fect an entire cure diminishes, but still such patients may live very any years, and ultimately die only from some intercurrent disease. nd, on the other hand, death has been known to occur as early as the d of the first week. Of course the existence of any serious compli- tion, and perhaps especially of marked cardiac disease from previous eumatic attacks, renders the prognosis unfavorable.

In conclusion, whenever, in a case of chorea, the convulsive move- ents become incessant, and the respiration embarrassed, and still ore when subsultus tendinum takes the place of the choreic move- ents, a fatal termination is greatly to be apprehended.

TREATMENT.—Many different plans of treatment, and a great variety drugs have been proposed for the cure of the disease under consid- ation. These facts alone may serve to teach us that the effects of eatment are not clearly appreciated, and also, when taken in connec- on with the circumstance that fatal cases are rare, that the disease nds naturally to recovery in a good proportion of the cases. This ature of the natural history of the disease is shown also by the evi- nce given by Dr. Bardsley, who mentions, that in the Manchester firmary, notwithstanding the variety of treatment adopted by suc- ssive practitioners, an incurable case had not presented itself in the urse of thirty-three years. (*Tweedie's Lib. Pract. Med.*, Am. ed., vol. p. 46.)

The only rules to be laid down for its treatment are those which pply to all the convulsive affections depending on functional disorder the nervous system, and on disordered states of the general health, nnected with a faulty condition of the functions of digestion and as- milation. These are attention to the general health, and especially a reful regulation of the diet and other hygienic conditions of the tient, the removal of any local derangement or disease that may exert unhealthy influence upon the nervous system, the use of tonics and

iron, and the employment of such remedies as have been found to
a controlling effect upon spasmodic and convulsive affections gener
and upon this disease in particular.

We shall consider, under different heads, the various means that
been recommended, endeavoring in the course of our remarks to
tinguish the cases to which each remedy is best adapted.

Purgatives.—This class of remedies has been extensively emplo
and often exclusively relied upon by some very high authorities, es
ally the English. When relied upon exclusively in the treatment
active cathartic is given every day, or every second or third day;
there can be no doubt that many cases have recovered under this p
In our own practice we must say that the treatment by cathar
alone has never succeeded well, and we have only used them of lat
such an extent as was necessary to secure a soluble and healthful co
tion of the bowels. When, therefore, the stools are natural and hea
ful in all respects, we do not think it proper to employ powerful pu
tives in the treatment of the disease. We resort to them only w
there is constipation, or when the discharges present some unnat
appearances as to color, odor, &c. Under the latter circumstances
may resort to any of the somewhat active cathartics, as cream of ta
and jalap, sulphate of magnesia, rhubarb, aloes, &c. When the
charges from the bowels are clay-colored, or dark and offensive, w
the mouth is pasty, the tongue loaded with a thick yellowish fur,
the breath heavy, it is proper to employ a mercurial. Dr. Cop
advises that we should commence with the exhibition of a full dos
calomel, either alone or with other purgatives, or followed by the
five or six hours. He adds that the doses of calomel ought not
frequently repeated in the disease, and thinks that it is not service
"to continue purgatives long, without either exhibiting them wi
bitter tonic or antispasmodic remedy, or with both, or alternating
with those remedies."

Antispasmodics are amongst the most important remedies we hav
oppose to the disease. The weight of evidence seems to show, ind
that they, in conjunction with a moderate use of purgatives, of to
especially ferruginous tonics, and of certain particular remedies,
with careful regulation of the hygienic conditions of the patient, oug
constitute the treatment in the great majority of cases. Of the var
remedies of this class that have been employed, those which hav
erted the most beneficial influence are valerian, assafœtida, oxid
zinc, camphor, the root of the cimicifuga or black snakeroot, and
bromide of potassium.

Particular Remedies.—Of the remedies belonging to this class, the
most employed in this city at present is, we think, the cimicifuga.
was first introduced into use by Dr. Jesse Young, and is now ex
sively employed and much relied upon. Dr. Wood (*Pract. of Med.*,
ii, p. 755), says: "I have in repeated instances found it of itself
quate to the cure of the disease." We have employed it ourselves
frequently in primary cases, and in two cases of relapse. In sever

rmer the children recovered entirely under its use; in some, ver, it failed to do any good, and recovery took place under the f iron, arsenic, the sea-bath, and in the course of time. In the relapsed cases, the patients recovered finally under the use of cimicifuga, iron, cod-liver oil, and good diet. One of the cases recovered under its use was among the worst we have ever met . It was that of a boy of nine years, in whom the disease went r as to destroy all power of locomotion. The child was unable to stand. At the same time, the movements of the lips, cheeks, tongue were so violent and irregular, and so little under the rol of the will, that the power of speech was lost entirely for a d of four or five weeks. The choreic spasm appeared to affect the muscles of deglutition, so that the act of swallowing was difficult and uncertain. Mastication also was impossible, and the was unable to carry anything to its mouth, rendering it neces- to feed him, as one would a baby, with soft solids and fluids. ng some two months, the muscles at the back of the neck were eakened that the head could not be lifted from the pillow or held t, but fell from side to side or forwards like that of an infant. The ition of the child was altogether one of the most complete and essing helplessness. During the first month of the case, it was ted with active cathartics, chiefly very large doses of cream of r and jalap, and with iron, but as the symptoms became worse and e, the cathartics were abandoned except so far as to maintain by occasional use of rhubarb and senna, a soluble state of the bowels, h were very much disposed to constipation. The patient was now upon the use of decoction of cimicifuga, of which he began with ounces, soon increased to half a pint per day, made in the propor- of half an ounce to the pint. The iron was continued. Under treatment he very soon began to amend, and in two weeks showed ry decided improvement. Cod-liver oil was now added to the iron cimicifuga, and in six weeks he was in great measure restored to th, and in the end recovered completely. In another case almost ad as this, the patient finally recovered under the same treatment.

he cimicifuga is given in powder, tincture, decoction, or fluid ex- t, and should be continued for several weeks in gradually increasing s, until some visible effect is produced, as nausea, headache, vertigo, isordered vision. The usual doses are from half a drachm to a hm of the powder, from one to two ounces of the officinal decoction, one or two drachms of a saturated tincture, given three times a day. our own part we prefer the decoction, of which we give to children ght or nine years old, from four ounces to half a pint a day, made e proportion of half an ounce of the root to a pint of boiling water. pared in this way, it is not a disagreeable drink, and is usually n without much objection.

he bromide of potassium in full doses has in some cases in our ex- ence proved of marked benefit. We have used it especially in those

ıg the dose until the signs of irritation have passed away, and
gain cautiously increasing it, we have usually been able to ad-
er it without serious inconvenience, and with excellent results in
e proportion of cases. This preparation may also be advantage-
combined with the bitter wine of iron.

chnia.—Trousseau recommends more highly than any other plan
atment, the use of sulphate of strychnia in gradually increasing
until the extreme limit of tolerance is reached. He begins by
g gr. $\frac{1}{28}$th twice or thrice daily, to children between five and ten
old, and cautiously increases this dose until it reaches about gr.
ı twenty-four hours. The results obtained by this treatment in
sseau's hands certainly appear good, but the risk attending it and
are demanded to prevent accidents are so great, that we should
r some of the equally successful and less dangerous methods. It
ars, however, that other observers, as West, have obtained good
ts from its use in doses much smaller than those recommended by
sseau, not exceeding gr. $\frac{1}{24}$th thrice daily, for children of eight or
ears of age.

ium maculatum, given in the form of the succus conii, has been
y recommended by Dr. John Harley (*The Old Vegetable Neurotics*,
on, 1869), in the treatment of chorea; and a certain number of
have already been reported of its successful administration. Dr.
ey prescribes the succus in the doses of 20 or 30 drops for a child
months old; a drachm for one over two years old; and from one
o drachms at ten years of age. In explaining the use of doses so
as these, he insists upon the fact "that hemlock given in doses
h fall far short of producing its proper physiological action, is use-
or the treatment of the diseases to which it is adapted."

muli.—The well-known views of Dr. Radcliffe upon the pathology
asmodic affections, have led him to recommend the free use of
olic drinks, to the point of obtaining their decidedly sedative
n on the economy, as the foundation of a rational treatment in
a.

thout being prepared to adopt this as a regular plan of treatment
dinary cases of the disease, we should certainly be disposed to ad-
ter alcoholic stimuli whenever the symptoms indicated the ap-
h of nervous exhaustion.

ics.—Whenever the disease occurs in debilitated and anæmic indi-
s, remedies of this class are evidently necessary, and prove of
efficacy. The ferruginous preparations are those most clearly
ed under the circumstances; and, indeed, there are many author-
Watson, Elliotson, and others, who consider the preparations
ufficient, of themselves, to cure almost all cases of chorea. Any
may be selected. The best are the subcarbonate, Vallet's
syrup of the iodide, and the pure metallic iron (ferrum per
). Quinine is also recommended when the patient is feeble
It may be given alone or in combination with iron. The
iron and quinine would form a very good prescription under

the circumstances mentioned. Cod-liver oil is an admirable when the child is thin and weak, and especially when there is suspect any tubercular predisposition.

A great variety of remedies besides those we have mention been employed, and have more or less evidence in their favor. A them are sulphate and iodide of zinc, nitrate of silver, subnitrat muth, iodine, calabar bean, and a host of others which it is us enumerate. The sulphate of zinc has undoubtedly proved effi in some instances. About two grains may be given at first thre a day, and gradually increased to six or eight if the stomach be remedy well.

External Remedies.—The cold plunge and shower bath as well affusions to the nape of the neck and along the spine have been fre employed as adjuncts to the internal treatment, and are of unq able value in many instances. The cases in which they are used however, be selected. They ought not to be employed unless f by full reaction, nor unless the child is willing to take them. W use of the bath terrifies or shocks the patient greatly, it cannot be A warm or tepid bath used once a day, or every second day, w ways be useful in promoting the general health, when the cold not borne well. Ether spray has been recommended by Lubelsk *Hebd.*, April 19, 1867), as an application along the spine, and a of cases in which its use was successful have been placed on rec

Sulphurous baths have been recommended and employed wit success, by M. Baudelocque of Paris. A rapid and definite cu obtained in 58 out of 65 cases. Thirty drachms of sulphuret of sium are added to each bath, which is employed for at least on daily, at a temperature of 91°. Generally amelioration occur the second or third bath, but sometimes not until after tw fifteen days, a mean of twenty-two days having served for the fifty out of fifty-seven cases. Where the cure is retarded, it ord depends upon the patient's powers being lowered by other reme insufficient diet, upon irritation of the skin induced by the b upon acute irritation of the internal serous membranes: circum contraindicating the baths while they continue. The conjunc other remedies retards rather than aids the cure. Deducting th in which the bath was improperly used under the above circums there remain but nine true failures in eighty-one cases, these almost all recent or rheumatic choreas. (Sée on Chorea, *Rankin* *stract*, No. 16, p. 51.)

Counter-irritation to the spine, in all its shapes, from pustulatio tartar emetic, issues, and blisters, down to frictions with coarse has been proposed and employed in the treatment. The use but the milder remedies of this class is unnecessarily harsh and except when the disease is evidently dependent upon an affect the brain or spinal marrow. The great majority of cases will r perfectly well without a resort to such violent means, and they therefore to be avoided.

ectricity has been resorted to, and apparently with good effects in e instances, and it might therefore be tried when other and simpler ns fail, or in conjunction with these means. In cases where the modic movements are constant and persistent despite the use of in-al remedies, the inhalation of anæsthetics has been tried, but with ertain results.

n violent cases, it is of course desirable to confine the patient to bed; it may be necessary to have padded sides made for it to prevent from dashing himself out of bed in his uncontrollable and violent vements. In such cases it may even become necessary to employ ded splints, or to envelop the body with bandages carefully applied r layers of wadding, so as to secure the legs together, and to confine arms by the sides.

ymnastic Exercises.—M. Sée (*loc. cit.*, p. 481) says that this method ne of the best that has been employed. He states that it was recom-nded by Darwin, and then by Mason Good, and was first employed Louvet Lamarre in one case, after which it fell into oblivion until e of the physicians of the Children's Hospital, at Paris, and amongst ers, MM. Bouneau, Baudelocque, Guersant, and Blache, "struck, no bt, like myself, with the good effects of gymnastics in scrofula and er cachectic diseases, and taught especially by the effects of mus-tion on the general health, conceived the idea of applying this treat-nt to nervous diseases, and particularly to chorea, which, besides perturbation of the nervous system, is so often attended with dis-ers of nutrition and of the functions of organic life. To put a stop his state of languor, to re-establish at the same time the equilibrium he movements, which are rather irregular than convulsive, to en-vor, in fine, by regulating the contractions, to break up their viti-d habit,—this is the triple object sought to be attained by gymnas-. Be it theory or empiricism, success crowned these previsions, proved the utility of the new treatment, of which we are about to dy the methods and its consequences." M. Sée says, that to com-nce the treatment, we must prescribe first simple and cadenced vements, and exercise at the same time the larynx by means of ging. "To place the child in a vertical position, make it flex and end the knees, touch the ground, stretch out and bend the arms, monizing at the same time these various movements by regulated ging,—such are the first means by which to replace the contractions der the power of the will. This end will be so much the more rap-y attained, as the attention of the patient is the less distracted, its elligence the less changed, and its temper the less capricious; so also t often impossible to succeed unless we first obtain control over the ient by kindness and gentleness.

After reaching this point, we may attempt walking, regulated to a w or quick step, running, jumping, hanging by the arms, or other more nplicated movements, always graduating them to the degree of the ease, watching them most carefully, and repeating them daily with-prolonging them beyond fifteen or twenty-five minutes, in order to

avoid muscular fatigue and palpitation of the heart, which occu
times when the exercises are too long continued.

"With these precautions, and no matter how severe the sym
we may, after a few lessons, and sometimes after the first, and a
after the fifth or sixth, perceive a manifest change in the abnorm
bility, which is usually so rapid that we are generally able to
after the first eight days, as to the efficacy of the treatment.
after this length of time, the patient can neither stand erect,
a straight line, nor hang by the arms, there is reason to fear t
method will fail; it is at least certain that it will be tedious a
ficult."

In Ranking's Abstract (*loc. cit.*, p. 50) may be found the fol
statements in regard to the treatment by gymnastic exercises:

They were first employed under the guidance of M. Laisné, g
tic professor of the Polytechnic School, their effects being tried
scrofulous children. "Commencing with simple movements of t
and arms, accompanied by appropriate songs, the children's p
was so rapid that they were soon able to employ the orthopœdic
the parallel bars, and other machinery, in succession. By the
eth lesson they were exercised in wrestling, and afterwards in r
special exercises being devised for the lame. From the first les
children became fired with emulation, and movements which
impossible were soon executed with ease and pleasure. A
amelioration was speedily observed, their countenances becomi
mated, their flesh firm, their voices stronger, their appetite kee
more regular; glandular swellings, which had long resisted all
ment, were resolved, and fistulous sores, that had been open for
closed up. The lessons, one hour each, were given three times a
and in the intervals the children amused themselves by repeati
of them as did not require machinery." This treatment, at fi
plied to scrofulous children, was, as stated above, extended to
laboring under nervous affections, partial paralysis, rickets, and
ally chorea. Since 1847, ninety-five children suffering from
sometimes so obstinate as to have resisted the most various trea
have been cured by this means alone, or in conjunction with othe
no accident has resulted from the employment of the exercises
movements are graduated according to the severity of the ca
they are repeated daily, but not for more than from fifteen to t
five minutes, so as not to induce fatigue or palpitation. "Impro
is sometimes seen after the first lesson, and at latest after the
sixth; so that at the end of a week we can judge whether the
are likely to prove efficacious, and if manifest improvement h
then taken place, it is doubtful whether the cure will be thus e
or if it is, it will be so only after a long time. The worst as well
slightest cases have reaped equal benefit, the cure in the favorab
only requiring a mean of twenty-nine days, and old or relapsed
being more amenable than recent. Dr. Sée has found that whe
remedies are conjoined with the gymnastics, the proportion of

s, and the period of their attainment later; and he recommends no
her adjunct to be employed than good diet." (Dr. Sée on Chorea,
. *cit.*, No. 16, p. 50.)

Hygienic Treatment.—The management of the hygiene of the pa-
nt is quite as important as any other part of the treatment. The
et should be arranged to suit the particular condition of the indi-
dual, and with a view to procure and maintain the most healthful
ssible state of the digestive apparatus. It should always be light
nd easily digestible, in order that neither the stomach nor bowels may
e oppressed and deranged by the products of an imperfect digestion.
hen the stomach is weak and dyspeptic, the food ought to consist
r some days chiefly of preparations of milk and bread, whilst in the
eantime, a tonic remedy is administered internally, in order to invig-
rate the power of that organ. As the digestive function becomes
ronger, the child ought, as a general rule, to be put upon the kind of
iet most likely to promote the general health and vigor of body. It
ught to consist of bread, milk, plain wholesome meats, and simple
egetables. Coffee and tea, and all other nervous stimulants, had
etter be avoided. The meats ought to be mutton, beef, or poultry.
here are few vegetables, besides rice, potatoes, and tomatoes, which
re suitable under the circumstances. All candies, preserves, unripe,
oarse, or dried fruit, hot bread and cakes, except the very simplest,
ught to be withheld.

Of dress we need merely say that it must be suited to the season.
xercise, or at least, exposure to fresh air and insolation, are of the
tmost consequence. When the disease is so violent as to prevent the
hild from walking, it ought to be taken to drive as often as possible.
n cases which seem connected with a debilitated and anæmic condi-
on of the constitution, removal to the country, and particularly to the
aside, will often effect a cure with great rapidity. Whenever, indeed,
patient inhabiting a large city or town can be conveniently taken to
he seaside in the summer, it ought to be done, for the change is useful
ot only at the time, but it lessens, also, by strengthening and invigor-
ting the constitution for the future, the danger of a relapse.

ARTICLE XI.

ATROPHIC INFANTILE PARALYSIS.

Paralysis in the young child, though occasionally met with in most
f the forms observed in the adult, most frequently presents itself in a
rm almost peculiar to childhood, characterized by total or partial loss
f power over one or several groups of muscles, usually without impair-
ent of sensation, and often followed by atrophy of the palsied muscles,
nd consequent deformities.

History and Synonyms.—Occasional allusions to infantile paralysis may be met with in medical writings even as far back as the latter part of the last century, but of such a vague and indefinite nature that the full recognition and accurate description of this peculiar affection cannot be said to date further back than the writings of Kennedy and Heine in 1836 and 1840 respectively. Since the publication of Heine's classical memoir, however, a number of observers have studied the disease with much attention and success. We have subjoined a list of the principal writings upon this subject to which we have been able to obtain access.[1] It will be observed that the vague and discordant ws which have been held in regard to its cause and nature, have to the employment of many names by which to designate it. Thus has been called by Heine infantile spinal paralysis, and Meyer fol- rs him in the use of this term; by Gull it was called paralysis ring dentition; by Rilliet and Barthez, Vogt, Eulenberg, Valleix, unniche, Laborde, and Niemeyer, essential paralysis of children; by ichenne, who is followed by Echeverria, fatty atrophic paralysis of ancy; by Reynolds, paralysis with wasting of the muscles; by Bou- ut, myogenic paralysis; by Hammond, organic infantile paralysis; d it has also been called idiopathic and congestive infantile paralysis.

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We have been led to select the name which heads this article, be- use those above enumerated appear to us to be either vague and in- curate, as the terms essential and idiopathic; or to neglect one of the ost striking features of the disease, the muscular atrophy, as the term antile spinal paralysis does; or to convey a partial or even erroneous eory of the pathology of the disease, as the names congestive and yogenic respectively do. The terms organic and fatty atrophic pa- lysis also seem to us defective, since the first is equally applicable to ses of palsy due to organic disease of the brain, while the second is sed upon the fatty degeneration of the affected muscles, which, how- er, occurs only in a portion of the cases of infantile paralysis.

CAUSES.—The etiology of this affection is very obscure, doubtless rtly owing to the fact that, as the paralysis occurs when the spinal stem is extremely impressible, the causes which induce it are trivial

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and usually entirely overlooked. Age is the only influence whic
be said to have a positive action in its production, since the grea
jority of cases occur between the ages of six months and two y
during the period of primary dentition. By several of the earl
servers especially, the disease was on this account attributed sole
dental irritation, but more careful observation shows that in
cases no such direct connection can be traced; and it is probable
early age and dentition only act indirectly by inducing a remark
susceptible condition of the entire spinal system.

Sex appears to have no influence whatever upon its production;
the disease is almost as frequent among the children of the wealth
among the ill-fed and ill-tended children of the poor. In some
cases, where the loss of power is sudden, the exciting cause seem
be the direct exposure to the local action of cold, as from sitting
a stone step (West).

Atrophic infantile paralysis is usually primary, and occurs in
midst of good health; but it has also been observed in a secondary
appearing during the convalescence from measles, scarlatina, or ty
fever, or during rheumatism and chorea.

In one of the cases following chorea, which are recorded by Ken
(*loc. cit.*), it is positively stated that there was a distinct cardiac
mur, due to organic valvular disease; and it may be suggested tha
essential cause of the paralysis was embolism of some of the spina
teries, as observed by Panum.[1]

MODE OF ATTACK; INITIATORY SYMPTOMS.—There is considerab
riety in the mode in which this disease makes its appearance.
some cases the paralysis is the first symptom observed, and is fou
have almost immediately attained its full extent, without any r
nizable cause or premonitory symptom. Thus the child may hav
peared perfectly well when put to bed in the evening, and yet on
following morning, there may be more or less complete loss of p
over the lower extremities. But in the great majority of cases,
cially the more severe ones, the attack is preceded by quite ma
constitutional disturbance. This may consist merely of fever, ap
ing without evident cause and lasting from a few hours to a wee
more, unattended by any gastro-intestinal disturbance. Or, du
this period, the child may also complain of pain in the back, or t
may be tenderness on pressure, especially in the lumbar region; t
is frequently slight dulness of the mind, or finally, in comparati
rare cases, one or more convulsion may occur. It is the rule, how
for no marked symptoms of cerebral disturbance to be present at
period of the disease. There are rarely any symptoms connected
the parts about to become paralyzed, though in an interesting cas
corded by Kennedy (*loc. cit.*), there was spasm of the muscles s
quently affected.

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[1] Ueber den Tod durch Embolie (Bibliothek für Läger, 1856), quoted by J
(op. cit., p. 297), and Arch. f. Path. Anat. xxv, 308, 443, 1863, in Year-book
Syd. Soc. 1863, p. 210.

The disease usually makes its appearance during health, but it is obable that many of the cases of paralysis occurring during con- lescence from the various exanthemata properly belong to this va- ety.

Whether preceded by initiatory symptoms or not, the development the paralysis is generally sudden, and it is only in rare cases that it partial at first and increases gradually. Indeed it usually happens at when first observed the paralysis is at its maximum, both as re- rds the number of muscles affected and the degree of the loss of wer, and that there soon occurs a diminution in its extent, so that ly some of the parts first affected remain palsied.

The form of the paralysis clearly indicates its spinal origin. Com- ete hemiplegia is scarcely ever observed, though in a few cases the m and leg of the same side, or even all four extremities, have been lsied.[1] Most frequently the disease takes the form of incomplete raplegia; though occasionally the paralysis affects single groups of uscles or even individual muscles.

According to Mr. Adams, the groups of muscles most frequently fected are: 1. The muscles of the anterior parts of the leg, forming e extensors of the toes and the flexors of the foot; 2. The extensors d supinators of the hand, these muscles being always affected to- ther; and 3. The extensors of the leg, and with them generally the uscles of the foot, as in the first group. When single muscles are fected, the most likely to suffer are these: 1. The extensor longus gitorum of the toes; 2. The tibialis anticus; 3. The deltoid; and 4. he sterno-mastoid.

The bladder and rectum are very rarely involved.

The degree of the paralysis varies as much as its extent; usually com- ete at first, in some cases it soon becomes partial or even slight; while others the loss of power remains absolutely complete. The paralyzed uscles are perfectly relaxed, so that the affected parts can have all eir normal movements impressed upon them without difficulty, and ll in a lifeless manner if left unsupported. The special senses are un- paired; and general sensibility is usually only blunted for a time. ccasionally it is not affected at all, or, as stated by West, there may ven be hyperæsthesia for a variable time.

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[1] With reference to the parts affected, in 43 cases observed and analyzed by West, only 2 was the arm alone palsied, though in 19 instances the paralysis was limited one or both legs. In 8 cases the right leg, and in 5 the left, was paralyzed; and one of the former instances paralysis of the right portio dura was also present. In instances, the right arm and leg, and in 8 the left arm and leg, were affected, with hich ptosis of the left eyelid was once associated, and once paralysis of the left portio ra. Paraplegia existed in 8 instances, combined in one case with paralysis of the ght arm, and in another with loss of power over both deltoid muscles, and over the xor muscles of both thumbs. Six times none of the limbs were palsied, but the af- ction was confined once to the portio dura of the left, and five times to the portio ra of the right side; but in one of these instances, though there was no actual pa- lysis, the patient's gait was feeble and tottering.

both to the induced and direct current.

The constitutional disturbances which we have described
the paralysis, may persist for a variable time after its de
disappear quickly, leaving no other symptoms present b
nected with the paralyzed parts.

The following case, seen by one of ourselves with Dr. J
may be quoted as an illustration of this form of paralysis

A male child, æt. thirteen months, was brought to Dr. Tyson for t
mother, an intelligent woman, with several healthy children. The fo
of the case was obtained: The little boy had walked at the age of ni
always seemed a vigorous, intelligent child; he had also cut eigh
much irritation. About Sept. 10th, 1868, after no particular expos
fretful and feverish, with occasional vomiting; and after three day
that right-sided hemiplegia had developed itself. The paralysis of th
complete, while the leg had entirely lost all power of motion. Thi
had not become complete suddenly, but, at first partial, had grad
There was no tendency to coma and no evidence of any acute pai
symptoms soon disappeared; the arm regained the power of motio
but the leg remained palsied. It also soon grew remarkably cold, an
October 1st, three weeks after the attack, the temperature was decid
that of its fellow. Sensation was impaired, but had never been ab
had been no paralysis of either bladder or rectum. At the time of t
the child seemed bright and lively, though rather pale. There wa
along the spine, nor in the leg. No reflex movements were develo
alyzed leg by tickling the sole of the foot. Neither atrophy nor defo
occurred.

The subsequent course of the disease varies greatly in
stances. In one set of cases, though the paralysis may b
sive and complete at first, the symptoms gradually subside,
disappears, and complete recovery ensues in from four t
These cases correspond exactly to the form of paralysis
scribed by Kennedy (*loc. cit.*) under the name of "Tem

st impossible to detect the radial pulse. The temperature of the ected part becomes perceptibly lower, the fall amounting, according Hammond, to from 5 to 8 or even 10 degrees, as tested by a galvan- eter. The muscles themselves undergo marked atrophy, frequently companied by fatty degeneration; and their reflex motility and elec- o-muscular contractility disappear. It is important to notice, how- er, that long after muscular contractions fail to be produced by the duced current, they may frequently be excited by the use of a direct rrent of low tension, slowly interrupted.

The mere wasting of the muscles is not, however, the only cause of e great difference in size between the healthy and paralyzed members. he nutrition of the whole limb is affected, and the growth and devel- ment of all its tissues arrested, so that the paralyzed member be- mes smaller in all its dimensions than its fellow. Rilliet and Barthez te an example which they observed, to show to how remarkable a gree this conjoined atrophy and arrest of development may progress. he patient was a young girl who was seized with instantaneous pa- lysis of the right lower extremity; and the following measurements ow the degree of inequality which was produced by four years' con- uance of the paralysis and arrest of development:

	Right leg.	Left leg.
From the great trochanter to the external malleolus,	49 cent.	54 cent. 5 mill.
From the patella to the malleolus,	29 "	32 "
Length of foot from heel to great toe,	14 " 3 mill.	18 "

Five months previously, the following diminution in thickness of the mbs was noticed: at three fingers' breadth above the patella, on left de, 20 centimetres, 16 on right: at the middle of the thigh, on left de, 29 centimetres, and 22 on right. The height of the child was 16 centimetres.

This wasting and palsy of the muscles is associated with relaxation f the ligaments, and the combination of these causes induces many of e deformities observed in childhood. When the paralysis affects one de of the body chiefly, it indirectly leads to various lateral curvatures the spinal column, probably from a want of symmetrical action in e muscles of the two sides.

In cases of paralysis of the arms, the relaxation of the ligaments bout the shoulder-joint and the atrophy of the deltoid allow the head f the humerus to drop out of the glenoid cavity, so as to produce even omplete dislocation, with apparent elongation of the paralyzed limb o the extent of three-fourths of an inch (West).

As the muscles of the lower extremities are far most frequently ffected in this form of paralysis, we usually find the resulting deformi- ies involving the feet and legs, where they constitute the greater pro- ortion of all cases of club-foot. According to Adams (*loc. cit.*), "these eformities occur in the following order of frequency: 1. Talipes equinus; , equino-varus; 3, equino-valgus; 4, calcaneus, or calcaneo-valgus; and

5, talipes varus. When both feet are affected, equino-varus of one is generally found with equino-valgus of the other."

In addition to the influence which the actual wasting of the limb the arrest of its development exert, Adams believes that the great c of such deformities is the "adapted atrophy" of Paget, the changes w ensue in consequence of the mechanical relations of the foot to the Although, however, it is true that paralysis of a group of muscles not excite active contraction in their opponents, it appears that in efforts of the child to move the part, the non-paralyzed muscles n gain control over the limb, and aid at least in producing the var characteristic distortions.

During the development of this atrophic stage, the general s bility of the affected parts is usually normal, and the general he intelligence, and nutrition of the patient unimpaired.

Duration.—As will be inferred from our description of the cour this affection, the entire duration and that of its different stages v greatly in different cases. In some, which have hence had the n "temporary" infantile paralysis bestowed upon them, the loss of p rapidly diminishes, and complete recovery follows in from a few to a few weeks; while, in other cases, the paralysis persists atrophy ensues, and the limb may remain crippled and useless thro out life. The period which elapses before atrophy commences, and rapidity with which it advances, also vary extremely, even in a ently similar cases. Thus the palsied muscles may begin to atr within four or five weeks, though more frequently this change ca be noticed for several months. Different muscles also atrophy very different rapidity, the deltoid and tibialis anticus appeari waste more rapidly than any other muscles of the body; and, in ferent cases, the same groups of muscles show equal variety in respect, a few weeks serving in some instances for as much wastin occur as would require months to produce in other cases.

Prognosis.—The great uncertainty of the progress and durati atrophic infantile paralysis render it highly desirable to ascerta possible, the conditions which determine its result. Of itself, it is n fatal; but, unfortunately, our prognosis is limited, in the early sta the disease, to this assertion, for the duration and course of the are not influenced, in any constant and reliable way, either by the of the patient, the extent of the paralysis or the parts affected, or initiatory symptoms. It may perhaps be stated that, in general, which are ushered in by high fever, especially if associated with vulsions, and in which the paralysis is extensive, will prove severe tedious. But there are too many exceptions to every particular of statement for it to be regarded as a general rule of much positive in prognosis.

When paralysis has lasted three or four weeks, we are able to d mine with much accuracy the approach of atrophy by the conditi the electro-muscular contractility; for it has been frequently obs at those muscles which lose their power of responding to the inter- pted current, soon begin to waste.

After the occurrence of atrophy, also, much valuable aid in prognosis gained from the use of electricity.

We may here mention the interesting and highly important obser- tion, first made in connection with this disease by Hammond (*loc.* t.) and J. Netten Radcliffe,[1] that in many cases where the atrophied uscles have lost entirely their power of reacting to the most powerful duced electrical currents, they will still react vigorously to a direct galvanic) current of low tension and slowly interrupted. The im- ortance of this discovery, in the treatment of the disease, can scarcely e overrated; and it has also enabled this point to be established in the rognosis, that whenever muscular contractions can be excited by either duced or direct currents, no matter how far advanced the atrophy of e muscles, the restoration of their power can certainly be accom- ished; though it would appear from a case successfully treated by ammond, that even when such contractions are not at first pro- uced, the prognosis is not absolutely unfavorable. The still more arious, and as yet inexplicable observation has also been frequently ade, that as the muscles regain their power of voluntary motion, eir susceptibility to the direct galvanic current is apt to diminish, ut, on the other hand, their normal reaction to the induced current turns.

The prognosis will also be materially influenced, especially when the trophic stage has begun, by the condition in which the tissue of the alsied muscles is found, as in cases where advanced fatty degeneration present, it is far more unlikely that they will ever regain their power. n order to ascertain this point, Duchenne has devised a small trocar,[2] alled by him "emporte-pièce," by which small pieces of muscle can e extracted, and subsequently submitted to microscopic examination.

It is evident, finally, that the duration and result will depend, to a reat extent, upon the period at which treatment is instituted. In those ases where the paralysis has been allowed to continue until marked trophy has ensued, and the electro-muscular contractility is almost st, although the prognosis may still be favorable as regards the ulti- ate cure, it must be carefully guarded as to the duration, since the reatment will probably require to be steadily pursued for many weeks, r even months.

Morbid Anatomy and Pathology.—It appears desirable to introduce he consideration of the anatomical appearances at this point, in order o facilitate the subsequent discussion of the pathology and diagnosis of he disease.

In regard to the changes which take place in the atrophied muscles, the brief yet complete summary given by Hillier, may be quoted (*op. cit.*, page 268):

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[1] See foot-note to page 665, vol. ii, Reynolds's System of Medicine.

[2] These trocars are manufactured by Tiemann, of New York. Dr. Hammond as published (Jour. of Psych. Med., July, 1867) a description of their form and ode of use, illustrated by a woodcut.

"1. The transverse striæ become less apparent and separated by wider spaces, which are filled with opaque granules, which are not dissolved by ether, but are sensibly acted on by acetic acid.

"2. The transverse striæ disappear, and there is an abundant appearance of granular substance.

"3. There remain but slight traces of longitudinal fibres, filled with granules, with a larger quantity of connective tissue between the bundles.

"4. The granules have disappeared, and empty transparent tubes of myolemma with a few scanty granules on their walls remain, with more connective tissue and some elastic fibres.

"5. In some cases, fat-globules take the place of the granular matter in the muscular fibres, and in the cellular tissue between the bundles of muscular fibre. This change is not universally present in cases even when atrophy has proceeded to an extreme degree."

The last conclusion stated here, which has been confirmed by other observers, shows that perhaps the most frequent change which occurs is a simple atrophy of the muscles, with a granular but non-fatty degeneration, and conclusively shows the inaccuracy of the name proposed by Duchenne for the disease (namely, fatty atrophic paralysis of infants).

In approaching the question of the lesions of the nervous centres in this affection, it is necessary to refer to the general question of the existence of so-called essential, purely neurotic paralyses. In one form of paralysis, the reflex, it is true that as yet no material lesion has been detected, and that the most plausible explanation of the loss of power in such cases is simply the exhaustion of the functional activity of the spinal cord, owing to the prolonged irritation of some of the peripheral nerves. And it must be borne in mind that by some the form of infantile paralysis under consideration has been regarded as a reflex paralysis depending on dental irritation. Apart, however, from the fact, that the symptoms much more closely resemble those due to spinal congestion than those seen in reflex paralysis, it is to be remembered that the disease is by no means limited to the period of dentition, and that all local signs of dental irritation are frequently absent at the time of the appearance of the paralysis. With the exception, then, of reflex paralysis, it may be asserted with confidence that all other forms of spinal paralysis are associated with some material lesion of this nervous trunk. It is to be remembered that it is only a few years since the beautiful researches of J. Lockhart Clarke have shown that positive structural changes, in both nerve-cells and nerve-fibrils, may be detected by microscopic examination in spinal cords, which present no alteration apparent to the naked eye. In rejecting the evidence of all post-mortem examinations of the spinal cord, made before the introduction of Clarke's method, as incomplete and inconclusive, we find that in all those diseases formerly classed as pure neuroses (such as tetanus and chorea), which have been subjected to this latter mode of examination, positive demonstrable lesions have at least occasionally been detected.

nong this class of diseases, so long considered as purely functional oses, atrophic infantile paralysis has always, until lately, occupied ominent position, as is evinced by the large number of authors who e described it under the terms "essential," or "idiopathic."

t is indeed difficult to secure opportunities of examining the state of spinal cord in this affection, owing to the fact that the disease is rcely ever, if at all, fatal of itself; so that the arguments in opposi- to the view of its functional nature, will be in part drawn from close analogy of its symptoms to those of certain spinal diseases, ich are well known to be attended with positive lesions of the ner- s tissue. Thus, in its mode of appearance, and in the character of paralysis, there is so perfect a resemblance to the onset and symp- s of congestion of the spinal cord, as to leave little room for doubt t this is the condition at first present in many cases of atrophic in- tile paralysis. In both this affection and spinal congestion, the pa- ysis may appear quite abruptly, or be preceded by pains in the back fever; in both, the paralysis is usually paraplegic, the loss of power y partial, and the affected muscles are relaxed; in both, general sen- ility is but slightly impaired, the bladder and rectum are not involved, there are no disturbances of the cerebrum or special senses; in both, ally, recovery usually follows, if proper treatment be promptly in- uted.

n those cases where the paralysis disappears within a few days or eks, it has been supposed by various authors that the nature of the ease is entirely different from that of atrophic infantile paralysis; t it appears to us highly unnecessary to complicate the question by h a supposition, since the temporary character of the paralysis is dily accounted for by supposing that the spinal congestion which duced it was slight and transient.

t is quite possible also that in other cases the loss of power caused more severe spinal congestion should persist until atrophy of the ected muscles ensued, and rendered the case more protracted.

ndeed, some of the authors who most forcibly support the view of pathology of this affection which we have given above, as Dr. C. B. deliffe (*loc. cit.*), hold that the lesion of the cord does not advance yond this stage of congestion. The evidence in support of this nion is principally found in the result of post-mortem examinations, those reported by Rilliet and Barthez, Fliess and Adams, where no ions of the cord were detected. But in none of these cases does it pear that the careful and skilful microscopic examination, which is w recognized as necessary to detect some lesions of the nervous sue, was performed; so that we may feel at liberty to doubt the mplete accuracy of these autopsies. On the other hand, it certainly ems entirely consistent to suppose that in certain cases, where the ngestion is unusually marked and prolonged, or where it is repeated, at a process of subacute inflammation should be excited, resulting in e permanent structural change.

The usual change which takes place in the spinal cord, under such

found, upon post-mortem examination, a cicatrix, partly filled with
t, in the lower part of the dorsal region, in the left anterior column.
cently, however, the opportunities for careful study of the lesions in
ophic infantile paralysis have multiplied, and have been seized by
merous able observers, especially in France, where the first demon-
ation of the true characteristic morbid changes in this disease was
ected. The earliest cases placed upon record in which this lesion
s accurately described were by Cornil (*loc. cit.*) in 1863; by Laborde
cit.), in 1864; by Prevost (*loc. cit.*), in 1866; J. Lockhart Clarke
cit.), in 1868; Charcot and Joffroy (*loc. cit.*), in 1870; and numer-
other observers have followed in confirmation, so that the morbid
atomy of atrophic infantile palsy may be regarded as clearly and
y determined.

The lesions occupy the antero-lateral columns, and especially the
erior horns of gray matter. There is atrophy of the nerve-fibres in
anterior and lateral columns, which varies in amount in different
es, and is associated with a varying degree of hypertrophy of the
erstitial connective tissue (sclerotic). These parts are more trans-
ent than natural, and often present a very appreciable grayish rose
to the naked eye. The consistence of the affected tracts is dimin-
ed, and upon microscopical examination there may be observed a
rked proliferation of the elements of the connective tissue, the cells
d nuclei being dispersed in the midst of a finely granular substance,
which there are fibrils of extreme tenuity. In the parts which are
st affected the nervous tubules are either lost altogether, or they
sent a varicose appearance, while the other portions of the spinal
umn preserve a perfect integrity.

But the most characteristic changes are found in the anterior horns
gray matter, where there is invariably atrophy of the ganglion
ve-cells and of their processes, so that in some instances the anterior
up of cells has entirely disappeared from atrophy. In other cases
remains of the cells are found atrophied, misshapen, and with gran-
r degeneration of their contents. The other elements of the gray
sue are usually changed also; there is proliferation of the nuclei of
neuroglia, and occasionally increase in the delicate fibrils of this
nective tissue. In some cases the walls of the vessels in the affected
ts are found thickened, with proliferation of their nuclei. These
anges have been so prominent in some cases as to have led to the
nion (Damaschino, Duchenne) that they constituted the primary
d essential lesion. This, however, does not seem probable.

It is thus seen that the progress of anatomical investigation has at
t developed the true pathology of this affection. It is possible that
some cases the lesion of the antero-lateral columns may be the re-
t of hemorrhage into the substance of the cord, or of pressure from
ckening of the meninges; but in the vast majority of cases the mor-
process is one of slow subacute inflammatory, sclerotic change,
th atrophy of the nerve-tubules in the antero-lateral columns and
terior horns of gray matter, and especially with atrophy and destruc-
n of the anterior groups of ganglion nerve-cells.

Diagnosis.—There is but little danger of overlooking the nature of those cases where the paralysis appears quite suddenly in the midst of apparent good health, excepting in cases occurring in young children who have not yet learned to walk, and where the loss of power is limited to the lower extremities. In such instances the paralysis may be entirely overlooked by the parents or nurse for some time. So also in cases preceded by constitutional disturbance, as there is nothing whatever characteristic in these premonitory symptoms, it is quite possible to fail to recognize the presence of paralysis. It is well, therefore, whenever a child between six months and three years of age presents feverish symptoms for which no apparent cause exists, to ascertain carefully whether there is any loss of power of its extremities.

The diseases with which atrophic infantile paralysis is most likely to be confounded, are other forms of paralysis of cerebral or spinal origin, and progressive muscular atrophy.

In paralysis due to hemorrhage into the substance of the brain (see page 523), the case is more apt to be ushered in by delirium or convulsions, followed by more or less marked coma, while in atrophic infantile paralysis there is either entire absence of cerebral symptoms, or at most a single convulsion occurs. Cerebral paralysis is usually hemiplegic, while in the form of spinal paralysis we are considering, paraplegia is more common, or the loss of power may be limited to one leg or to a single group of muscles. In those comparatively rare cases where the paralysis is at first hemiplegic, the arm usually soon regains its power of motion, leaving the leg paralyzed; while the reverse of this occurs in cerebral hemiplegia, where the leg usually improves much more rapidly than the arm. In cerebral paralysis, also, the affected muscles are frequently rigid instead of being relaxed; and there is not the tendency to atrophy and deformity, the loss of electro-muscular contractility, nor the lowering of the temperature of the affected part, which are observed in atrophic infantile paralysis.

In cases of meningeal apoplexy where the hemorrhage has occurred *upon* the surface of the brain, the symptoms are still more distinct. Thus (see page 524) there are usually repeated convulsive seizures, with somnolence during the intervals: paralysis is rare and partial, while strabismus and tonic contraction of the hands and feet are very common.

In acute inflammation of the spinal cord, or myelitis, the loss of power is complete, and there is also more marked loss of sensation, and paralysis of the rectum and bladder, with alkaline urine; though there is here as well as in atrophic infantile paralysis, diminution of reflex excitability and electro-muscular contractility, and wasting of the paralyzed muscles. The symptoms first mentioned, the more grave character of the case, and the tendency of the paralysis to increase rather than decrease, suffice to distinguish myelitis from the affection under consideration.

Progressive muscular atrophy, of very rare occurrence in children, may be distinguished by its gradually progressive course; and by the

servation of the temperature of the affected parts, of the power of
tion, and of electro-muscular contractility, until atrophy has far ad-
nced. There is usually a quivering of the atrophied muscles in this
ease, due to fibrillar contraction, which is entirely wanting in atro-
ic infantile paralysis.

We have already expressed our belief that some of the cases where
e loss of power is very temporary, are really instances of reflex pa-
ysis, and in such some source of peripheral irritation can usually be
tected.

West alludes to the fact that in those cases where the affection is
ited to one leg, and attended by hyperæsthesia and painful sensa-
ns, the disease may be mistaken for coxalgia, though the diagnosis
y readily be made by attending to the slow course, the absence of
ralysis, the fixed pain in the knee-joint, and the marked increase of
ffering caused by forcing the head of the femur against the acetabu-
m, which characterize hip-disease.

TREATMENT.—The treatment of atrophic infantile paralysis may be
vided into that adapted to the early stage and that directed against
e second stage or period of atrophy.

In the first instance we must endeavor to discover and remove any
citing cause of the paralysis that may exist. If symptoms of mor-
d dentition have preceded, and the appearance of the gums indicate
they should be lanced; or if gastro-intestinal disturbance is present,
the presence of worms is suspected, laxatives should be administered.
pid baths are also recommended, as tending to allay irritation and
duce feverishness.

When, however, no local irritation can be detected to render it pos-
ble that the case is one of reflex paralysis, we should direct our reme-
es towards relieving the spinal congestion, which we believe to exist
cases of true atrophic infantile paralysis. Counter-irritation should
applied along the spine, and may be effected by producing a narrow
ister, or preferably by the use of sinapisms or stimulating liniments,
ntaining croton oil, ammonia, or turpentine.

Local abstraction of blood by means of cups or leeches applied along
e spine has been recommended by Fliess; and we should certainly
vise its employment, especially in those cases where there is consid-
able febrile disturbance and pain in the back.

There are also certain remedies from which we have obtained excel-
nt results in the treatment of spinal congestion in the adult, and
ould, therefore, recommend their employment in the early stage of
is affection.

These are ergot, which may be given in the form of fluid extract,
ginning with doses of about 5 minims for a child of two years old;
d belladonna, which may be given either in the form of tincture, or
aqueous solution of the extract. Iodide of potassium may also be
ven in combination with one or the other of these, in doses of gr. j
ij for a child of two years old, in the hope of preventing the devel-
ment of any inflammatory changes in the cord.

In addition to these remedial measures, the child should be lutely confined to bed.

If, despite the use of these agents, the paralysis persists, the te rature begins to fall, and the muscles to atrophy, every means mu adopted to promote the general nutrition of the child so as to fa ably influence indirectly the changes in the spinal cord; and, at same time, local treatment must be instituted to promote the cir tion and nutrition of the paralyzed parts.

Among the internal remedies, iron is one of the most suitable, may be given in any eligible form. The pyrophosphate is per especially indicated on account of the phosphoric acid with which iron is combined.

The various preparations of nux vomica or its alkaloid strychnia also very valuable after the acute stage has passed. Heine advises use of tr. nucis vomicæ in combination with camphor and pyrethr while West recommends the alcoholic extract of nux vomica. Strych which is more frequently employed than the preparations of nux vo itself, is usually given in the form of solution. Hillier has also us hypodermically, but without marked benefit.

The doses of these powerful drugs, which are recommended by s authors, especially Heine, appear to us too large to be safely ad istered.

We should recommend beginning with a dose of at most gtt. ij o tincture, or gr. $\frac{1}{20}$th of the alcoholic extract of nux vomica, or gr. of sulphate of strychnia, for a child of two years old; the amount b increased steadily but cautiously so long as no unpleasant symp are produced by it.

Local means must also be employed for inducing increased circula in the affected parts. For this purpose, the stimulating liniments alr mentioned, or moist heat, may be applied. Passive motion, and kn ing the muscles, also aid in improving their nutrition and contra power.

Electricity, however, certainly ranks first among the local mean restoring the contractile power of the paralyzed muscles. It is that several authorities have asserted that they derived no good re from its employment, but since the introduction of localized electri (faradization), as developed by the researches of Duchenne, and of use of the constant current, the most marked benefit has been obta at all stages of this form of paralysis.

If the induced current be used, it must be carefully isolated limited to the affected muscles, by means of wet sponges fastene the electrodes. In those cases where the muscles refuse to respon an induced current even of considerable power, the direct current, sl interrupted (the labile current of Remak), will be found to induce tractions, excepting where the muscular tissue is far advanced in degeneration. In all such cases then, this direct current shoul employed. We have already alluded to the curious observation w has been made by several authors, that as the palsied muscles re eir power under the use of the direct current, they respond to it less d less strongly, while the induced current is found to again have the wer of exciting muscular contractions. When this period in the atment of the case arrives, it is probably desirable to substitute the e of the induced current.

In order that the use of electricity, in either form, may be productive the excellent results it is capable of yielding, it must be applied oroughly to each of the paralyzed muscles three or four times weekly, d this treatment pursued for months, until the muscles regain both eir size and contractile power.[1]

One of the earliest symptoms of improving nutrition is an elevation the temperature of the part, which may readily be detected by the alvanometer, as before mentioned. The value of this mode of treatent is, indeed, so great "that so long as muscular contraction can be duced, recovery is merely a matter of time, but if no action of the ralyzed muscles can be brought about, the prognosis must be unfavorble, though even here there is some hope." (Hammond, Radcliffe.)

In addition, however, to the local and general measures above recomended, there is another kind of treatment scarcely less important, hich should be employed in conjunction with them.

This consists in the use of such mechanical apparatus and gymnastic xercises as shall tend to bring the affected muscles into play, and to bviate the deformities of the atrophic period. The greater part of our nowledge upon this subject, is due to the admirable and extensive obervations of Heine, who has the superintendence of a large orthopædic stitute, and has most carefully studied the effects of these agents upon ases of paralysis which have progressed to the stage of atrophy and eformity. But it is by no means to this advanced stage alone that uch measures are adapted, for it is a matter of the highest importance, hat from a very early period of the paralysis, the little patients should e subjected to this treatment.

If the legs be affected, it is not surprising that the child, who has, erhaps, gained but imperfect use of its limbs, and is making its first ssays in walking when the paralysis appears, should feel such a sense f insecurity, even when the power of motion has returned to a coniderable extent, that it will refuse to make any renewed efforts to walk. And the parents, finding all their attempts to persuade or compel it to o so unavailing and distressing to the child, are apt to desist, waiting

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[1] For a full description of the best forms of electrical batteries for medical purposes, he reader is referred to Meyer's work on "Electricity in its Relations to Practical Medicine," translated by Hammond (New York, 1869). Among the best and most onvenient forms of both induction and direct current batteries, are those made by Stöhrer, of Dresden, which can be had from his agent in London, J. F. Pratt, 420 Oxford Street. There are also several induction current batteries, of portable size and quite reliable and powerful, which are imported from Paris, and can be had at the stores of our electricians.

Among batteries of American make, those of the American Galvano-faradic Manufacturing Company are the most convenient and reliable.

ay readily be surmised that this orthopædic plan of treatment is
quiring the utmost patience and persistence, and the most loving
sion and encouragement; for, indeed, it must be pursued, in face
pparent failure, for months and years. Nor must we be satisfied
this period with these efforts we are making to restore the
of the muscles; but careful attention must be paid to the nutri-
nd general health of the child, and we must continue the use of
arm douche, in conjunction with the persistent use of electricity,
ulating frictions, and of every remedy calculated to promote the
al nutrition of the child.

ARTICLE XII.

FACIAL PARALYSIS.

ALYSIS of the muscles supplied with motor power by the facial
, is frequently met with as a temporary condition in infants who
been delivered by forceps, as a result of the pressure of the blade
instrument upon the nerve as it emerges from the cranium. It
no means rare, however, during childhood, and either appears
nly after exposure to cold, when it is possibly due to pressure
d by congestion and swelling of the tisssues around the stylo-
id foramen; or more gradually, when it is usually due to pres-
rom an enlarged gland, or to disease of the petrous portion of the
ral bone.

e symptoms of this affection are so striking that no difficulty can
as to its diagnosis. The eye upon the affected side remains open;
ower of knitting the forehead and of raising the eyebrow is lost;
ngle of the nose and mouth on the same side hang down. The
trickle over the cheek, and the conjunctiva frequently becomes
ed or inflamed; saliva dribbles from the mouth, portions of food
t between the teeth and paralyzed cheek, and there is inability
histle, spit, or distend the cheeks with air. During the acts of
ing or crying, the face becomes distorted, owing to the immo-
of the paralyzed side, while the antagonistic muscles act strongly
raw the features towards the sound side.

cases due to an affection of the nerve in its course through the
us portion of the temporal bone, usually depending upon caries or
sis of this bone, there are present, besides the symptoms above
ioned, purulent otorrhœa, deafness, diminution in taste on the side
tongue corresponding to the paralysis, and in some cases unilat-
aralysis of the velum palati.

e possibility of mistaking simple facial paralysis for hemiplegia
cerebral hemorrhage must be borne in mind, though attention to
ymptoms of the case will prevent any error in diagnosis. Thus

History; Synonyms and Frequency.—True progressive muscular atrophy is extremely rare in young children; and among the cases which have been described, as by Meryon,[1] a certain number seem to belong to the disease now under consideration. The merit of having first clearly recognized and described the distinctive features of this latter affection, certainly belongs to Duchenne, whose first observations were published more than twelve years ago.[2] Since then cases have been reported in rapid succession until the number now upon record must exceed 60. The disease cannot therefore be regarded as a very rare one. There have been, we believe, but four cases placed upon record in this country: by Drs. Ingalls and Webber,[3] by one of ourselves,[4] by S. Weir Mitchell,[5] and by E. M. Estrazulas.[6] In addition to these four cases, of which we have had the opportunity of carefully studying three, a fifth case has recently been admitted to our ward in the Children's Hospital, presenting the characteristic symptoms in a most marked degree.

Various names have already been applied to the affection. It was originally called "hypertrophic paraplegia of infancy," by Duchenne, but he has since substituted the terms, paralysis with muscular degeneration (paralysie myosclérosique), or muscular paralysis with apparent hypertrophy (paralysie musculaire pseudo-hypertrophique). It has also been called "lipomatosis luxurians musculorum progressiva" (Heller); lipomatous muscular atrophy (Seidel); progressive muscular paralysis, as a result of hypertrophy of the interstitial fatty tissue (Niemeyer); fatty muscular hypertrophy (Bergeron and Lutz); and, finally, progressive muscular sclerosis (Jaccoud and others). We much prefer this latter term, since it expresses the true pathological process which is present, and at the same time does not tend to confound this disease with any of the forms of true paralysis, from which it is, in reality, clearly distinguished by the facts that its essential feature is a progressive change in the structure of the muscle, and that the loss of power is dependent upon the change in the muscular tissue, and is not primary, as in all true palsies.

Causes.—The essential causes of progressive muscular sclerosis are unknown. There are, however, some influences which exert marked control over its occurrence. One of the most important of these is *early age*, since in a very large majority of cases the disease begins in childhood, and has even appeared in some cases to be congenital (Niemeyer). Although, however, it must be distinctly classed among the affections of childhood, it has been shown (Benedikt, Lutz, and Laycock) to occasionally occur in adult life. *Sex* also exerts a powerful influence: of 45 cases collected by Estrazulas (*loc. cit.*), in which point was noted, it occurred only 7 times in females.

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[1] Pract. and Path. Researches on Paralysis. London, 1864, p. 200, *et seq.*

[2] De l'Electrisation Localisée, 2ème ed., Paris, 1861.

[3] Boston Med. and Surg. Journal, Nov. 1870.

[4] Clinical Lecture on a case of Progressive Muscular Sclerosis, by William Pepper. Philadelphia Med. Times, June 15th and July 1st, 1871

[5] Photographic Review, October, 1871.

[6] Obstetrical Journal of Great Britain and Ireland (American Supplement, p. 81), Sept. 1873, vol. i, No. 6.

The curious fact has also been observed, that several children i same family are apt to be affected, probably indicating some heredi tendency. Eulenburg[1] is consequently inclined to regard the di as dependent upon some congenitally defective formation of the ce nervous system, probably in the cells of the gray substance o spinal cord. Instances are on record where four brothers were aff (Meryon); and in another two brothers (Eulenburg); and in still other by the son of the latter author, in which the affection first sh itself in three sisters successively in the eighth year of their age.

SYMPTOMS.—The disease either begins in early infancy, and is manifested at the time the child should begin to walk, or it make appearance some years after the power of walking has been acqui

The disease usually affects first the muscles of the legs, and adva upwards; in Niemeyer's case, on the other hand, it began in the gl muscles, and subsequently affected all the muscles of the lower ext ities. The early symptoms are, therefore, connected with walking it is observed either that the child does not begin to walk until late, and then walks imperfectly, or that, having walked well for se years, he begins to be readily tired by standing or walking, and presents peculiarities in his gait. When the disease is fully establi though before it has advanced far, the mode of walking and sta are quite characteristic. The patients find that, without some sup these operations become more and more difficult and painful, and they are subject to frequent falls. In order to maintain their eq rium while standing or walking, the lower dorsal and lumbar spi arched forwards, while the upper part of the spine, the shoulder head are bent backwards, frequently to so great an extent that point of equilibrium falls behind the pelvis, thus producing the de ity known as "ensellure" or "saddle-back." The legs are widely arated, and in walking the body is inclined laterally towards th which rests on the ground, thus producing a characteristic balanci the body during progression, while the arms are swung about, an legs are advanced by jerks, describing a small arc.

While this impairment of strength and power of progression is d oping, the affected muscles undergo remarkable changes. For a they may be noticed merely to cease developing and increasing in or, more rarely, as in the case reported by one of ourselves (*loc* and which is quoted below in full, they may present a well-ma stage of atrophy. After the stage of muscular weakness has laste a variable time, from a few months to two or even three years, wh or not there has been any noticeable atrophy of the affected mu a progressive enlargement of them makes its appearance. This us affects the gastrocnemii first, then the glutei, the lumbar muscl the spine, of the trunk, and finally the muscles of the arms, and f the face. This order is not invariably followed, and in by no means very case is the affection of the muscles so universal. The apparent ypertrophy may occur in nearly all the muscles which have shown weakness, but in general, according to Duchenne, it does not, and may ven be limited to a very small number of them. The same observer *loc. cit.*), thus describes the appearance of the muscles after this con-ecutive enlargement has occurred.

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[1] Virchow's Archiv., liii, 361.

. . . "The hypertrophied muscles are firm and elastic; they become very hard while they contract, and show all the relief or projection which properly belongs to their contracted state; they then appear to form a hernial protrusion through the integument, which is very thin; moreover, their great size shows off the apparent smallness and deli-cacy of the joints at the knee, ankle, &c."

When this pseudo-hypertrophy is marked, and affects many muscles, t gives a most curious appearance to the children. Niemeyer speaks f his patient as looking "as if he had the body and head of a weak hild on the hips and thighs of a strong man;" and J. Lockhart Clarke, n describing one of Duchenne's patients, says: "He looked like a little Hercules. Every visible muscle of the body, except the pectorals, was normously developed; his head, even, appeared swollen, and the tem-poral muscles stood out like convex shells. Yet, when the poor boy attempted to walk, he labored to get along, presenting the most gro-tesque appearance; and when laid on the ground, he was wholly un-able to rise by his own unaided efforts."[1]

Dr. Mitchell (*loc. cit.*) calls attention to the fact, however, which we have also observed, that the enlargement of the calves is lower down than would be the case in excessively developed, but well-formed limbs.

The marked enlargement of the muscles of the calves is often attended with forced extension of the feet, producing double pes equinus or equino-varus. In the case reported by Estrazulas (*loc. cit.*), there is also marked enlargement and retraction of the posterior muscles of the thigh, with atrophy of the extensor group, so that there is forced flexion of the legs, rendering the boy unable to stand at all. Knoll[2] also describes such contractions in the enlarged muscles, but they are not usually present. According to Berger,[3] fibrillar contractions are of constant occurrence in the affected muscles: this does not accord with our own observations, nor with many of the reported descriptions of the disease.

The electrical condition of the affected muscles is peculiar. Fre-quently the results, when tested with faradaic currents, are different from those obtained with galvanism. The results also vary at differ-ent stages of the same case. Usually the muscular contractility, as ested by faradization, is impaired in all the affected muscles, those which are hypertrophied, however, contracting more actively than those which are atrophied. The galvano-contractility is also slightly impaired. The electro-muscular contractility has been found unimpaired in the earlier stages of the disease; but later it diminishes, the muscles continuing, however, to respond actively to galvanism after they have partly lost their power of responding to faradization.

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[1] Trans. of London Path. Soc., vol. xix, 1868, p. 6.

[2] Wien. Med. Jahrb., 1872; and in Syd. Soc. Bienn. Retrospect, 1871–72, p. 71.

[3] Deut. Arch. f. Klin. Med., March, 1872, Bd. ix; Hft. 4, 5, p. 363.

Electro-muscular sensibility has been found normal or impaired in different cases: in one of our patients it was diminished to faradization, but remained acute to galvanism.

The skin over the affected parts often presents a marbled or mottled appearance. In one case that we have seen (described by Mitchell, *loc. cit.*), the mottling "consists of spaces of pallid skin surrounded by quite regular circles of congestion, which affect an irregular polygonal shape." The skin is usually thin and delicate, and can be easily lifted from the muscles. Disorders of the cutaneous sensibility have not been usually found, but Berger (*loc. cit.*) describes violent neuralgic pains and formication, followed at a later stage by anæsthesia.

The temperature of the parts is lowered. This can be distinguished by the hand, and has been found, on careful thermometric study, by Mitchell, to be as follows: Left axilla, 97.5°; right axilla, 97°; perineum, 94.5°; right calf, 91.5°; left calf, 91°; and Estrazulas, in the case observed by him, reports the temperature in both axillæ 98°; on right calf, 91⅜°; and on left calf, 91°.

The following case, which has already appeared in print (*loc. cit.*), may be quoted as an illustration of many of the previous remarks:

W. E., æt. 20, was admitted to the Philadelphia Hospital, April 19, 1871. He was born in Virginia, and has resided there or in the District of Columbia until the present time. His parents are both dead,—his father from cholera, his mother from some unknown cause. He had two sisters and a brother, all of whom are dead,—two from unknown causes; but one sister had paralysis (apparently hemiplegia) and was unable to walk for some time before her death. The patient himself was a delicate and weakly child so far back as he can recollect. He never suffered either from malaria or rheumatism. He was engaged in the country on a farm, and his strength was overtasked by heavy lifting. He never, however, met with any injury. Six years ago he began to notice gradually increasing loss of strength in the legs, which progressed so slowly that for eighteen months he was still able to run about, though not so actively as other boys. He was not obliged to use a cane until two years ago, and since then only in walking considerable distances. This gradually increasing debility was attended with no pain, formication, or subjective sense of change of temperature in the legs. There were also no contractions or cramps of the muscles. The progressive debility had not continued long before he noticed that it was necessary, when he was standing or walking, to throw his shoulders back and protrude his abdomen and lower part of the thorax, thus showing that the muscles of the back were affected at a very early date. During this early period he could walk quite naturally, but in running he threw his shoulders far back and stretched his legs widely apart; he assumed the same position also in going up an elevation. Two years later the muscles of the arms became affected in the same way as those of the legs and back. During the first three years he merely noticed that the legs did not grow as they should do, but afterwards atrophy began, first in the muscles of the calves, shortly after in those of the thighs and of the back, and soon afterwards in those of the shoulders and arms. About two years ago, after the atrophy of the muscles of the calves had become very marked, he noticed that they began to increase in size, and this growth has continued until they have acquired a size much greater than they ever had previously. This process of renewed growth next appeared, about one year ago, in the muscles of the forearm, and has continued at a slow rate. During all this time his weakness has steadily increased; he has, however, never been kept in bed by it, but has been able to get about feebly by the aid of a cane. He has never had sense of constriction about any part of the body. His appetite throughout has been good, his digestion fair, and bowels regular. His urine has always been passed with ease, and has merely been noted to be occasionally yellow. About one year ago he was seized, without any apparent cause, with a severe epileptic convulsion, and since that time he has had similar attacks at intervals of from fifteen to thirty days. He has usually been unable to tell when these fits were coming on, but occasionally he has had a strange feeling in the head, and has thought of foolish things, before the attacks. The fits have been attended with entire unconsciousness, sudden falling to the ground, and muscular convulsion. He has usually been half a day in entirely recovering from them. He has never had more than two convulsions on the same day.

Present condition.—His expression is natural, mind active, and special senses unaffected. The muscles of the face are not involved, and their action is perfect. His tongue is clean and moist, appetite fair, digestion easy, and bowels regular. There is no enlargement of the abdominal viscera. The urine is normal and secreted in normal quantity. His respirations are easy, twelve in the minute, chiefly diaphragmatic: the vesicular murmur is soft and healthy. The cardiac sounds are normal. The pulse is 75, in the recumbent position.

Muscular system.—The muscles of the neck (sterno-cleido-mastoids and extensors of the head) are of fair size, and their movements are strong and free. The trapezii are feeble, and he retracts the shoulders with difficulty and feebly. The pectoral muscles are moderately wasted and feeble. The scapular group of muscles are less wasted and the scapulæ do not project markedly from the thorax, so that the serrati magni are probably not much wasted and enfeebled. The deltoids are extremely wasted and he is unable to raise either arm within thirty degrees of the horizontal plane; when the arm is raised, there is a marked depression below the acromion process. The biceps muscles are also extremely wasted, and he is able to flex the forearm only a little beyond a right angle. The triceps muscles are also very feeble, and the long head of each is greatly wasted, while the external and short heads appear as quite prominent fleshy masses.

The forearms seem unduly large in comparison with the atrophied arms, and are in reality larger than they have ever previously been. They have, moreover, a peculiar blunt and swollen appearance, owing to the sudden enlargement of the muscles above the wrists. The atrophy of the forearms seems never to have reached the degree attained elsewhere, so that the degree of consecutive hypertrophy has not been so marked as in the calves. The grasp of the hands is decidedly weaker than would be expected from the size of the forearms, that of the right being much weaker than that of the left hand. There has been no atrophy of the muscles of the hands.

When he sits up in bed, he is only able to hold the shoulders back with effort; there is increased bowing forward of the vertebral column, with absence of the lumbar depression. There is decided wasting of the erector spinæ muscles on either side. When lying in bed, the lumbar spine is raised, so that the obliquity of the pelvis and hypogastric region is increased. The muscles of the abdomen and thorax are not wasted, and preserve good strength.

When he is lying down, the feet are strongly extended and adducted (equino-varus), so that the toes point towards each other, while the soles rest on the bed. There is great prominence of the tarsus. The muscles of the thighs are all much wasted, as

Stöhrer), and electro-muscular sensibility is acute. The muscles of the thighs spond, but with more difficulty, to the galvanic current.

following measurements were taken :

rm, greatest circumference,	7	inches.
orearm, circumference one inch above wrist,	6	"
" " at middle,	8¼	"
" " three inches below elbow, point of greatest thickness,	8½	"
thigh, circumference hand's breadth above knee,	10¼	"
" " at middle,	11½	"
" " close to perineum,	12⅞	"
calf, " at thickest part,	12⅞	"
m, corresponding point,	7	"
rearm, " "	6	"
" " "	8⅛	"
" " "	8⅝	"
igh, " "	10½	"
" " "	11⅝	"
" " "	12¾	"
lf, " "	12¾	"

e general *sensibility* is everywhere normal, and there are no subjective disturb- of sensation. The circulation of the extremities is somewhat feeble, and both s and feet readily become bluish on exposure to cold. The color of the surface wever, everywhere normal, without any mottling.

ril 30.—He had to-day an epileptic attack, with frothing at the mouth, general ular spasms, and unconsciousness, lasting for eight minutes. There was deep r and sleep for four hours subsequently, and he did not entirely recover until llowing morning. The fit was preceded for about a minute by the foolish fan- e has frequently had before.

dered syr. phosphat. comp , f℥ij, t. d. Faradization of arms and legs on alter- days.

fragment removed by Duchenne's "emporte-pièce" from the left deltoid was of htly pale reddish color. When examined microscopically, a large majority of brils showed distinct, though often fine and delicate, transverse striation. In instances, striation was entirely absent, the fibrils looking homogeneous and like ground-glass cylinders. In a very few fibrils, also, distinct longitudinal tion was visible, and in others there was multiplication of the nuclei in the sar- nma. In not a single fibril was there any trace of fatty degeneration. The s varied in size from $\frac{1}{465}''$ to $\frac{1}{230}''$, or even, in a few cases, $\frac{1}{180}''$. The stria- was particularly faint, or at times even absent, in the largest fibrils. There was ge amount of interstitial white fibrous tissue, with abundant granular matter ining many oval nuclei. In places there were small collections of minute fat- ules or refracting granules.

agments removed from the gastrocnemii presented closely analogous conditions. muscular tissue was merely rather paler red than normal. The muscular fibrils d greatly in appearance and in size. The transverse striation was in some s perfectly healthy, but in a majority it was altered, though in various ways. , in some it was very faint and difficult to distinguish ; in others, it was wholly t, the fibrils presenting the appearance of fine ground-glass. In other fibrils was a marked appearance of longitudinal striation, due to delicate fibres or fine fusiform cells arranged in the long axis of the muscular fibril. In many s there was distinct excess of the nuclei of the sarcolemma, which appeared as oval nuclei with a punctiform nucleus. A few fibrils presented streaks of mi- fatty granules along their centres, and a very small number were decidedly . The muscular fibrils varied greatly in size also. Many were about $\frac{1}{250}''$ to in diameter; but a number were $\frac{1}{450}''$ to $\frac{1}{400}''$, while others were as much as , $\frac{1}{140}''$, $\frac{1}{200}''$ in width. There was a large excess of interstitial tissue, in places g the form of long, narrow, wavy bands of pure white fibrous tissue ; in others, appearing as abundant granular stroma, thickly strewn with oval nuclei. Th was also some curly, elastic fibrous tissue. There was a considerable amount of in stitial fat, existing as scattered globules, or arranged in patches of large, closely gregated fat-globules. In places, isolated muscular fibrils lay imbedded in this fibr tissue so as to be scarcely visible; but in other places a number of fibrils lay dire in contact with each other, forming a little bundle, around which the excessive gro of interstitial tissue had occurred. The arterioles and capillaries appeared healt No nerve-fibrils were detected.

The patient continued for several months upon the above treatment, and appea to gain slightly in strength. The recurrence of his convulsions was checked by l doses of bromide of potassium; still it could not be said that any material impro ment had occurred, when he left the hospital, and was lost sight of.

There is usually an entire want of disturbance of the general heal The appetite remains good until a late period, digestion is well pe formed, and the action of the bowels is regular. Neither the rectu nor the urinary bladder becomes paralyzed. There is frequently entire want of cerebral symptoms, and the mind may be clear until th close of the case. In several instances, however, the patients hav been of feeble intelligence, or even idiotic; and in the case above r ported, it will be remembered that the disease was complicated wi epileptiform convulsions.

Course and Duration.—As will be inferred from the foregoing d scription, the duration of this disease is very considerable, varyi from five to fifteen years, or even more. It may occupy several yea in reaching its full development, and may then remain at this stage several years, or even until a tolerably advanced period of youth, b finally it is succeeded by a stage in which the loss of power becom more complete and extensive, involving the upper extremities a muscles of respiration, and confining the patients to the recumbe position. During this final stage there is a rapid decrease in the si of the hypertrophied muscles, and the limbs may even come to prese an appearance of great atrophy.

Death usually occurs before adult age from sheer prostration or fro some intercurrent affection of the respiratory organs.

Prognosis.—The course of this disease is steadily progressive, an despite the various plans of treatment adopted, usually leads to a fat result. In one case, however, recovery took place, and in one oth there was some improvement. In the case we have here reporte there seemed to be some temporary improvement under treatment.

Diagnosis.—The diseases from which it is most important to distin guish progressive muscular sclerosis are atrophic infantile paralys and progressive muscular atrophy. In infantile paralysis, howeve the suddenness of attack, frequently associated with fever or with som cerebral disturbance, as convulsions; the occurrence of complete a more or less extensive paralysis; the gradual disappearance of the p ralysis in some parts, while in others it remains permanent; the dim nution and ultimate loss of electro-muscular contractility; the occu rence at a later period of fatty degeneration and atrophy of the affect muscles, with arrest in the development of the bones and marked d formities; and the entire absence of any secondary enlargement of th parts involved, constitute a series of distinctive features so clear and decisive as to render the differential diagnosis easy and certain.

A disease from which it is much more important to carefully distinguish progressive sclerosis of the muscles is progressive muscular atrophy occurring in childhood. The especial importance of the relations of these two diseases depends on the fact that both are alike diseases of nutrition of the muscles, thus constituting a group quite distinct from all the forms of true paralysis. In both the disease begins—usually without any apparent cause—insidiously, and progresses slowly but surely. In both the loss of motor power is secondary to the changes in the muscular tissue; in both the muscular degeneration and consequent loss of power almost invariably progress steadily to a fatal result. These two diseases, then, stand related to each other as being alike caused by disturbance of the trophic nervous system, but they are at the same time most positively separated from each other by marked differences in their course and symptoms.

Thus, in progressive muscular atrophy, the disease nearly always begins in the upper extremities, and invades subsequently the trunk and lower extremities. Indeed, Duchenne has pointed out that when this disease appears in childhood, which is quite rare, it usually begins in the face, where it produces atrophy of the orbicularis oris and the zygomatici, and does not extend to the trunk and extremities until after a period varying from two to three years. It then follows the same descending course seen in cases occurring in adults. The atrophy usually affects the muscles irregularly, so that various deformities and vicious positions of the parts involved are developed. Microscopic examination shows a progressive fatty degeneration and atrophy of the muscular fibrils, and in proportion as this increases there is loss of power and of electro-muscular contractility. One further symptom of high diagnostic value is the frequent occurrence of fibrillar contractions in the affected muscles, which, although stated by Berger to be of constant occurrence in progressive muscular sclerosis, has not been found so by ourselves or other observers. Finally, the muscles which have progressively atrophied never undergo any secondary enlargement, nor does microscopic examination reveal any lesion of the interfibrillar connective tissue. In all of these particulars, then, progressive muscular atrophy differs widely from progressive muscular sclerosis, which is almost exclusively a disease of childhood, beginning in the muscles of the lower extremities and advancing upwards, producing a peculiar mode of standing and walking, and in which the affected muscles, with or without a previous stage of atrophy, undergo remarkable enlargement, usually without fibrillar contractions, and with preservation of electro-muscular contractility till a comparatively late period of the disease. The results of microscopic examination, also, as detailed in the t paragraph on the morbid anatomy, are entirely different from e observed in progressive atrophy.

ORBID ANATOMY AND NATURE.—There is still an urgent need of care- skilfully conducted microscopic examinations of the nerve-centres in

this disease. The examinations which have been made up to this t
one of which was conducted by Cohnheim, have yielded negativ
sults: but we are not aware that, in a single instance, the microsc
study has been conducted with the requisite care and thorough
Until this is done, it is impossible to do more than speculate u
the seat and character of the intimate, essential changes. Anal
with other diseases of the nutrition of the muscles would seem to
port the suggestion of Eulenburg, that the pathological origin of
disease is to be found in some defective formation or disease of
cells of the gray substance of the cord. Berger (*loc. cit.*) assumes
existence of trophic nerves, and attributes the disease to some dist
ance of their function. Duchenne, on the other hand, ascribes it
paralysis of the vaso-motor nerves; and others again regard it
primitive muscular lesion.

The condition of the affected muscles themselves has been very c
fully studied during life, on small fragments removed by Duchen
trocar[1] (emporte-pièce), and the results confirmed by examination a
death.

When examined by the naked eye, their color is altered, and
muscles present either a uniform pale or yellowish appearance, or
marked with stripes of yellow or yellowish-white; on section t
shine with a dull, greasy lustre.

The results of microscopic examinations vary somewhat at diffe
periods of the disease. The changes affect both the muscular fib
and, even more markedly, the interfibrillar connective tissue.

In the early stage, Berger asserts (*loc. cit.*) that he found in two c
an absence of change in the interstitial tissue, and a marked hyper
phy of the fibrils themselves. This enlargement has not, howe
been constantly observed. The fact of its occurrence, and of its
sistence in some fibrils even in a comparatively advanced period of
disease, is confirmed by the observation of Leyden,[2] Estrazulas
cit.), Knoll (*loc. cit.*), and ourselves. In the later stages, many
the fibrils are pale and small, being occasionally reduced, accordin
Cohnheim, to $\frac{1}{5}$th their normal diameter; in some places empty she
of sarcolemma are seen. Many of these fibrils, though altered in
present no other morbid condition, either fatty or granular. K
observed in some of the broader fibres a tendency to split into
and Martini[3] describes a peculiar process of fission or division of
of the atrophied fibres. In the cases recorded by Meryon (*loc.*

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[1] This useful little instrument is shaped like a trocar. The blade is, howe
hollow cylinder, composed of two parts, one of which, bearing the point, is
while the other can be withdrawn a little by sliding a movable button on the ha
The trocar is introduced closed into the substance of the muscle, the button
rawn, so as to open the cylinder and allow a fragment of muscle to project int
button is then pushed forward, cutting off and securing the little morsel of

Berl. Klin. Wchnschr., 1866.

entralblatt, 1871, 641; in Syd. Soc. Bienn. Retrospect, 1871–72, p. 70.

hich were probably of this form of disease, a granular degeneration the muscular fibres, with rupture of the sarcolemma, was observed. The most marked change is, however, in the condition of the inter-itial tissue. It is not known definitely whether this precedes all ange in the muscular fibrils themselves. But at least by the time at enlargement of the muscular masses can readily be detected, there usually, despite the two observations of Berger, marked proliferation its nuclei and hyperplasia of the fibrils. This continues to increase til at places the muscular fibres are separated by broad tracts of vy fibrous tissue, interspersed with fine nuclei. At a later period is is associated with increasing interstitial fatty accumulation and generation, which advances with varying rapidity, even leading in me cases to such extreme accumulation of fat as to be visible to the aided eye as yellowish streaks. It is probable that the muscular res may temporarily share the exaggerated nutrition of the surround-g connective tissue, but later, as this interstitial tissue accumulates, e fibrils are subjected to severe pressure, and undergo atrophy in any instances. The entire process, therefore, seems to be of a strictly lerotic character, so far as the interfibrillar connective tissue is con-rned, but associated with an irregular and as yet undetermined stage true hypertrophy of the muscular fibrils themselves.

TREATMENT.—The results of treatment in progressive muscular scler-is have so far been highly unsatisfactory. The internal remedies om which most benefit may be expected are those which tend to im-ove nutrition, and especially to improve the tone of nutrition of e nerve-centres. Among these, cod-liver oil, iron, the compound rup of the phosphates, and arsenic, may be specially mentioned. In e case reported by ourselves, where there was the complication of pileptiform convulsions, benefit was derived from a course of bromide potassium.

The remedy, however, from which most good is to be expected, is ectricity. This has been used by Duchenne with great benefit, in the rm of faradization of the affected muscles. It is asserted by Bene-ikt, that good results have been attained in three cases by the use of e direct current, the copper pole being placed over the lower cervical nglion, and the zinc pole along the side of the lumbar vertebræ, by eans of a broad metal plate. Others have, however, tried this mode treatment for a long time without any success. As, however, no ore plausible mode of treatment has yet been suggested, we should be clined to adopt it in conjunction with direct faradization of the affected uscles, and the use of the internal remedies above recommended.

eat heat of the skin, and, usually, copious acid perspirations. The at of the skin and frequency of the pulse constitute a good index of e severity of the disease, and we may always apprehend a dangerous tack when the temperature rises above 104° or 105°.

With this febrile action, we find disturbances of the digestive functions; the tongue is heavily coated, the appetite lost, or nausea may be esent, and the bowels are sluggish, the evacuations being dark and ensive.

The local phenomena attending this fever depend upon acute inflamation of some of the large joints.

Occasionally the ankles, knee-joints, wrists, elbows, and shoulderints will be simultaneously affected; but in far the majority of cases, few only of these articulations will be involved, and the others become fected subsequently, if indeed they do not escape entirely. But one the most characteristic features of this specific rheumatic inflammaon, though most marked in the chronic form, is its tendency to shift its at, and we may find the intense pain and heat of one part transferred ithin twenty-four hours to a distant joint. We can rarely learn from e little patients the character of the pain which causes such bitter mplaints; in one mild case, recorded by Rilliet and Barthez, it was mpared to frequent light blows given upon the affected joints.

The *heat* of the inflamed part is always much increased, and it is ot unusual to find its temperature ranging from 100° to 105° (Aiten).

The *swelling* is generally considerable, so that the shape of the parts ay be much changed. When the knee-joint is inflamed, the effusion ay raise the patella from its position on the condyles.

The skin over the inflamed joints usually presents a more or less deded blush.

We must not, however, overlook the fact that the severity of these rticular troubles is not always commensurate with the rheumatic fever, nd that frequently, especially in very young children, the local signs ay be slight or even absent, and the only feature which tends to reeal the real nature of the disorder may be soreness, evinced by cries n every attempt to move the patient.

DURATION.—The duration of acute rheumatism varies exceedingly. ccording to Rilliet and Barthez, it follows a much more rapid course children than in adults, occasionally yielding at the end of six days, nd nearly always before the fifteenth day. We have, however, seen e rheumatic fever last twenty-one days, and before convalescence was lly entered upon, six weeks had elapsed.

There is a marked tendency to relapses and second attacks in rheuatism, at whatever age it occurs; and we frequently meet with chilen of twelve or fifteen years of age who have passed through three four acute attacks of this disease.

CAUSES.—*Age.*—Early infancy appears to protect, to a certain ext, against this affection. Rilliet and Barthez allude to a case occurg at the age of seven months; but the earliest age at which they met h it was at four years in a single case.

of rheumatic fever, the affections with which it might be most
y confounded, are pleurisy and pneumonia, and typhoid fever.
absence of the physical signs of the two former affections, and of
arrhœa and delirium of the latter, should, we think, lead the phy-
to suspect the rheumatic nature of the attack. And if, in addi-
here should be any fixed pain about the limbs, or unusual soreness
ain on being moved, or if any sign of cardiac inflammation be de-
, this suspicion would be confirmed. Thus in a case seen by one
where at first the height of the fever and the great thirst led us
pect the existence of pneumonia or pleurisy—of which, however,
ysical signs could be detected—the occurrence, on the third day,
nplaints of pain in the right groin, led to a more careful examina-
f the heart, where the presence of a soft, faint mitral murmur,
ed the nature of the attack.

ATMENT.—The indications for treatment presented by acute rheu-
m have been universally recognized as uniform, but the measures
ed to meet them embrace almost all known remedies.

prominent indications are:

'o aid in the elimination of the rheumatic poison, which has set
specific inflammations and fever.

'o relieve pain.

'o guard assiduously against all complications, and to aid conva-
ce by suitable nourishment and tonics.

ong the remedies which appear to be most productive of benefit,
alies, especially the bicarbonate of soda and acetate of potash, as
mended by Garrod; the bromide of ammonium has also been used
erably of late, with apparent benefit. When the fever is very
d, nitrate of potash, in carefully graduated doses, is often beneficial.
iodide of potassium is most serviceable in cases of muscular rheu-
n, or in somewhat chronic cases of the articular form. Rilliet
arthez assert that they have derived more benefit in the inflam-
y complications of rheumatism (endo- and pericarditis, and pleu-
from large doses of this salt than from any other drug.
remedies we have ourselves found most useful, consist of acetate
icarbonate of potash with opium, which we are in the habit of
during the acute stage, according to the following formula:

℞.—Potass. Acetat., ... ʒj.
Potass. Bicarb., ... ʒj.
Tr. Opii Deodor., ... gtt. xxiv.
vel Tr. Opii Camph., ... fʒij.
Syr. Zingiberis, ... f℥j.
Aquæ, ... ad f℥iij.

ol. S.—A teaspoonful every two or three hours, at four or five years of age.

, particularly in the form of Basham's solution of the peracetate
, should be given so soon as the intensity of the fever has miti-
The necessity for this remedy is but too often seen in the sal-
næmic appearance of convalescents from rheumatism, which
the rapid and extreme disintegration of the red corpuscles of
ood during an acute attack of this disease.

n: "That bedding in blankets reduces from sixteen to four,
-fourths, the risk of inflammation of the heart, diminishes
ity of the inflammation when it does occur, and diminishes
r the danger of death by that or any other lesion."

ortance of confinement to bed in this disease is difficult to
te; the inflamed condition of the joints absolutely demands
tendency to cardiac inflammation warns us to save the
nnecessary exertion, which strict attention, as above recom-
the equable warmth of the surface, effects better than any
s.

diet in this affection, we must be guided by the acuteness of
ms and the condition of the patient. If the fever be marked,
ild vigorous, a diet chiefly consisting of milk and water is
to the early part of the attack, but so soon as the febrile
passed off, or when the patient is of feeble constitution, we
oft-boiled eggs, and meat-broths, with advantage; and fre-
will find concentrated nourishment and a moderate amount
required towards the close of the case.

ATIONS.—In those cases where, despite our precautions, the
of the heart are threatened with inflammation, as evinced
pain in the cardiac region, frequency of pulse, and oppres-
before the development of any murmurs—we should lose
employing local depletion by leeches or cups, abstracting as
as the urgency of the symptoms and the vigor of the con-
stify. After the removal of the cups or leeches, warm mush-
hould be applied steadily over the whole præcordial region.

ZYMOTIC DISEASES.

his title, as already stated, we include those acute general
hich are dependent upon the action of some infectious mor-
le introduced into the system from without. They embrace
ive group, of which we shall describe diphtheria, mumps, and
d the group of eruptive fevers.

ARTICLE II.

DIPHTHERIA.

ON; SYNONYMS; HISTORY; FREQUENCY.—Diphtheria is an
e, moderately contagious, and infectious asthenic blood dis-
rring both endemically and epidemically; without character-
ion, and distinguished by a disposition to the formation of
branes upon inflamed mucous surfaces, especially in the
pon abrasions of the cutaneous surface.

disease called by the older writers, angina maligna or gan-

grenosa; cynanche maligna; garotillo; angina suffocativa, under wh
name it was described by Dr. Samuel Bard, of New York, in on
the best of the early essays upon this subject (*Trans. Amer. Philos.*
vol. i).

It is, indeed, thought probable, that the history of this affection
be traced back to a period beyond the time of Hippocrates; but
questionably the writings of Aretæus, who flourished in the se
century of the Christian era, contain a distinct description of this
lignant sore throat. He describes it under the names of ulcus S
cum and malum Ægyptiacum.

From this period, there is quite frequent mention of the disea
the works of medical writers; the earliest account of its appearan
modern times being given by Hecker, who describes an epidemic
that prevailed in Holland, in 1337.

About the middle of the last century, it prevailed in Paris, wh
was described by MM. Malonin and Chomel; and in some parts of
land, where it was studied and described by Fothergill, though
now doubted whether the disease to which he refers was not
nearly allied to scarlatinous angina.

The first full description of this affection published in this cou
was the paper, already referred to, by Dr. Bard, based upon an
demic which appeared in 1771; the views advanced in which have
universally recognized, even to the present day, as most clear and

From that time, the complaint seems to have attracted but litt
tention, until its occurrence at Tours, in 1818, and subsequent y
called forth the treatise of Bretonneau in 1826, in which he gave
first precise notion of the disease, and bestowed the name diphth
upon it.

Since then it has occurred frequently epidemically in Franc
1857 it appeared almost simultaneously in England, and in the ext
western part of our own country, and from that time has occurr
the form of epidemics of greater or less extent and severity, in the
varied climates and seasons, in almost all known parts of the glob

Diphtheria, the name by which this epidemic pseudo-membra
angina is commonly designated, is a synonym of the word diphth
originally used by Bretonneau in his treatise on this subject.

Διφθερα and *Διφθερυς* both mean "the prepared skin of an ani
and *Διφθεριτης* and *Διφθεριας* signify alike, "that which is covered w
skin or membrane."

No cases of death from diphtheria in Philadelphia are report
the annual lists of mortality published by the Board of Health,
the year 1860. In the preceding report, however, Dr. Jewell men
that several severe cases had occurred, some of which had proved
One of us can, however, assert from his personal experience, that
marked cases of diphtheria were of not rare occurrence in this ci
a number of years before that time, but were reported under
names, and usually as either croup or angina.

It is probable, however, that the disease did not prevail at all previously to its great outbreak in 1860, as may be seen by a ce to the number of deaths from croup and scarlatina, returned years preceding and subsequent to that date.

TOTAL NUMBER OF DEATHS FROM

	Scarlatina.	Croup.	Diphtheria.
855,	163	265	
856,	992	268	
857,	704	256	
858,	241	292	
859,	232	312	
860,	206	354	307
861,	329	304	502
862,	461	258	325
863,	275	444	434
864,	349	455	357

total number of deaths from scarlatina, from 1855 to 1859 inclu- ere 2332; from 1860 to 1864 inclusive, 1620, or 712 less than in vious period.

total number of deaths from croup from 1855 to 1859 inclusive, 393; from 1860 to 1864 inclusive, 1815, or 422 more than in the ıs 5 years. And, further, during the latter 5 years, 1860 to 1864, ths from diphtheria amount to 1925.

ES.—In regard to the epidemic and occasionally endemic nature theria, the evidence is unanimously favorable, but it is still, to in extent, an open question as to how far it possesses contagious ectious properties.

erous authorities might be cited in favor of either of these to the on of the other; but the evidence adduced convinces us that diph- is both contagious and infectious also, though to a moderate de- ly.

, Trousseau,[1] Guersant, Valleix[2] (who has himself fallen a victim disease), Rilliet and Barthez,[3] Wood,[4] Empis,[5] and many others, to its contagiousness; and we have ourselves seen unmistakable es in our own practice.

onneau[6] also maintains strongly the infectious nature of diph- and holds that it is transmitted directly by contact with the mor- duct generated by the local disorder, *i. e.*, the pseudo-membrane; must be admitted that the cases now on record, in which the has been so transmitted, are too clear and well authenticated nit of doubt.

t from these well-ascertained properties, nothing is as yet known with regard to the general conditions which favor its production it appears to have prevailed with equal severity in healthy ar healthy situations; in damp marshy districts and in dry hilly re in the crowded filthy houses of great cities, and in sparsely pop villages; in the depth of winter and in the intense heat of summ

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[1] Clin. Méd., 2ème ed., 1865, t. i, p. 385.

[2] Guide du Méd. Prat., 4ème ed., 1861, t. i, p. 530.

[3] Mal. des Enfants, 2ème ed., 1853, t. i, pp. 343–369.

[4] Pract. of Medicine, 6th ed., 1866, vol. i, pp. 505–525.

[5] Memoirs on Diphtheria (New Syd. Soc. ed., 1859), p. 332.

[6] Id. Op., pp. 127 and 177.

Nor can it yet be positively asserted (although it is probabl with regard to diphtheria, as in the case of other zymotic dis that children of feeble constitution and those subjected to bad hy conditions, or debilitated by severe illness, are particularly exp it, especially in the sporadic form.

The effect of local causes, of a depressing character, upon the p tion of diphtheria, was investigated by Dr. Ballard,[1] in regard to 5 cases. Inquiries at the houses where the 57 deaths had occ showed that in 24 instances the houses were damp, and that de drains or some similar cause gave rise to offensive smells; in 4 the inmates were overcrowded, and the ventilation deficient; in 8 the drinking-water was foul, or there was some noxious accumu and in 25 cases, nothing whatever could be discovered amiss in t gienic condition of the houses.

It is certain, however, that occasionally diphtheria appears in radic form, and isolated cases occur which can be attributed to no cause whatever.

We subjoin a table of the mortality from croup and diphtheria community during the seven years from 1862 to 1868 inclusive which we base, to a great extent, the remarks which follow as causation of the latter disease.

Season.—As we have already remarked, the influence of seaso the prevalence of diphtheria is comparatively slight, and the numerous records of epidemics occurring in the summer, as wel the winter months. Notwithstanding, however, it will be seen our own city the mortality from diphtheria does not vary very during the months from September to March inclusive, whilst the other five months it falls off from thirty to fifty per cent., th mum mortality usually occurring in June. We have before had oc to allude to the difference, in this respect, between diphtheria and which latter disease shows in the clearest and most marked mann direct influence of season upon its frequency.

Thus croup is far most frequent during the three months of N ber, December, and January, and, with the exception of Februa comes less and less frequent as you leave these months in either tion, until during July, the hottest month of our year, it falls t less than one-fourth of its maximum frequency. During the month, diphtheria, whose maximum mortality is one-third les that of croup (both maxima occurring in December), causes mor half as many more deaths than croup does, the proportion bein to 10.

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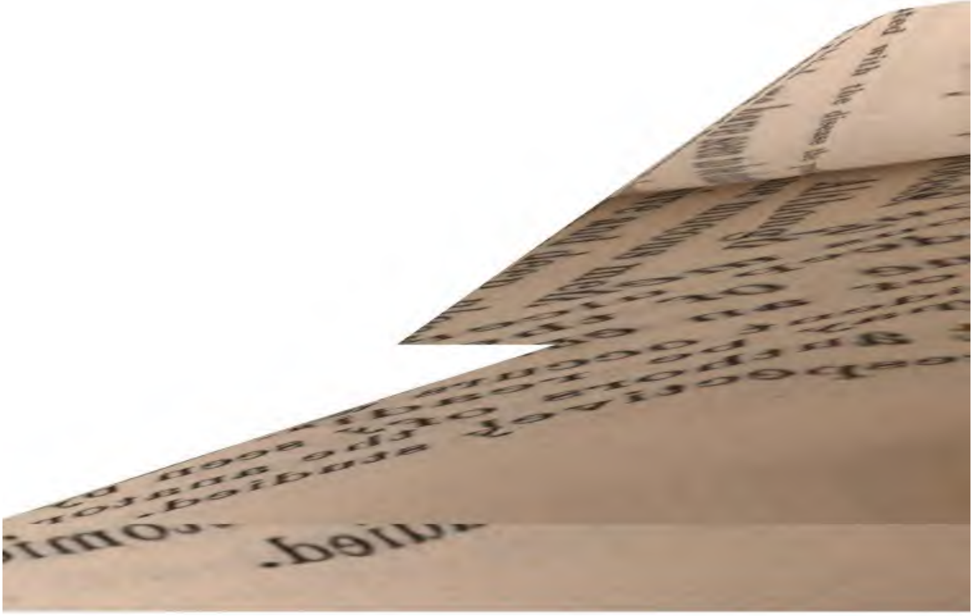
[1] Med. Times and Gaz., July 23d, 1859.

MONTH.	1862.		1863.		1864.		1865.		1866.		1867.		1868.		Mean of these Seven Years.		Mean Temperature for Seven Years.	Mean Fall of Rain during Seven Years.
	Croup.	Diphtheria.	Croup.	Diphtheria.	Croup.	Diphtheria.	Croup.	Diphtheria.	Croup.	Diphtheria.	Croup.	Diphtheria.	Croup.	Diphtheria.	Croup.	Diphtheria.		
January, .	44	30	36	34	59	27	44	33	43	24	22	17	34	12	40.3	25.3	30.87°	3.828
February,	24	40	27	42	39	26	50	30	31	19	13	9	8	7	27.4	24.7	33.89°	4.103
March, . .	29	26	26	24	62	43	44	28	30	21	20	17	18	6	32.7	23.6	40.85°	4.328
April, . . .	15	22	34	31	36	15	23	22	13	8	21	10	16	12	22.6	17.1	52.27°	3.97
May, . . .	17	22	11	17	41	27	18	12	27	19	12	9	11	10	19.6	16.8	62.77°	5.959
June, . . .	7	12	17	18	19	21	12	20	11	12	6	6	10	2	11.7	13	71.97°	5.239
July, . . .	8	24	20	33	11	22	15	10	4	12	8	7	4	6	10	16.3	77.71°	3.875
August, .	7	24	12	35	19	30	15	14	12	15	3	8	8	4	10.8	18.6	76.62°	4.105
September	16	24	55	68	34	34	21	12	4	13	4	5	10	7	20.6	23.3	68.31°	5.616
October, .	18	40	49	36	33	47	33	25	22	16	25	11	26	18	29.4	27.6	56.3°	3.19
November	36	32	69	34	51	31	43	29	24	18	16	8	29	12	38.3	23.4	46.68°	3.62
December,	37	29	87	62	51	34	32	25	18	15	35	11	32	22	41.7	28.3	34.7°	3.822
Total,	258	325	443	434	455	357	350	260	239	192	185	118	206	118				



ever, from the attending constitutional symptoms being less severe he external than in the ordinary form, the tendency to deposit upon cutaneous surface usually presents itself in cases of a typhoid adynic type.

t appears, indeed, that this pseudo-membrane may occur at any nt of the body to which the atmospheric air has access; but it has er been noticed on parts which are removed from its influence.

Notwithstanding these apparently distinctive features of the diph- eritic deposit, it is impossible by mere ocular or microscopic examina- n to distinguish it from the pseudo-membranous deposit in cases of dinary scarlatinous angina.

It is more, therefore, in the peculiar constitutional disturbance that must look for the specific nature of diphtheria, than in the presence d characters of the false membranes.

The *Submaxillary Glands* are almost always enlarged, though they rely acquire the enormous size and peculiar brawny induration so ten noticed in scarlatina. It is, moreover, very rare for this condi- n to terminate in suppuration of the gland.

The *Heart* has been found, by Hillier,[1] in a state of fatty degenera- on in two cases, and by Bristowe (*id. loc.*) in one; all of which were ther chronic. In some instances where symptoms of endocarditis ere present during life, the auriculo-ventricular valves have been und in an incipient stage of inflammation. (Bridger.[2])

Heart-clots of large size and firm consistence, evidently of ante- ortem formation, are also found in a certain number of cases where ath has been preceded by peculiar signs of circulatory embarrassment.

The *Lungs* are not rarely found inflamed and consolidated to a greater less extent. In other cases the exudation is found penetrating eply into their structure, filling the smaller bronchial tubes, and the ng itself is in parts collapsed or carnified.

Bouchut speaks of having seen small apoplectiform patches, similar those which precede the so-called metastatic abscesses in pyæmia.

The *Kidneys* are at times quite healthy; in other cases, however, ey have been found congested, and the renal epithelium granular and tached, so as to distend the tubules, which also contain fibrinous sts (inclosing granules of hæmatin, blood-corpuscles, or a few altered ithelial cells). (Hillier (*loc. cit.*), Greenhow,[3] &c.)

The *gastro-intestinal canal* presents no lesions of importance; in a few ses enlargement of the solitary glands of the lower part of the ileum s been noted.

Secondary Form.—When diphtheria appears in the secondary form, e mucous membrane is more violently inflamed. It is of a deep red lor, rough, and very much thickened and softened. The tonsils are ge and soft, uneven, and often infiltrated with pus. In addition, the ucous membrane is far more frequently and seriously ulcerated in this

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[1] Diseases of Children, Am. ed., 1868, p. 154.

[2] Med. Times and Gaz., Jan. 1864, p. 201; and Brit. Med. Jour., Oct. 22, 1864.

[3] On Diphtheria, New York, 1861, p. 160.

he breath in this case is offensive, but not fetid; and there is but
e salivation.

Vhen, in favorable cases, the disease is left to pursue its natural
rse, the pseudo-membrane becomes thinner, assumes a grayish tint,
l falls off about the sixth or seventh day. When, on the contrary,
ical remedies are applied to the throat, the membrane is often de-
hed after one, two, or three days, but may be reproduced several
es before the conclusion of the case.

n some unfavorable cases, on the contrary, even though the exuda-
n may disappear more or less completely from the pharynx, it extends
wnwards into the larynx, and we have true croup developed, which
too often proves fatal in spite of all remedies.

n more violent cases, the pseudo-membrane, about the time that it
ins to be detached, assumes a grayish or blackish color, and hangs
shreds from the surfaces to which it was attached. The fauces, under
se circumstances, present a gangrenous aspect, the mucous membrane
ving an appearance as though it were falling off in sloughs; the breath
xtremely fetid, and there is more or less abundant salivation, or in
ne cases an expuition of sanguinolent fluid.

There can be no doubt that it was from misconception of such cases
these, that the titles of gangrenous and putrid sore throat arose.

As the exudation disappears from the pharynx, the swelling of the
rts affected gradually subsides. The mucous membrane, from which
e plastic matter has just fallen, is more or less injected and red; the
isils and soft palate are sometimes found to be reduced below their
tural size.

Even when the throat affection is very severe, there is not often so
ich difficulty in opening the jaws nor in deglutition as is met with in
rlatina.

The *submaxillary glands* are almost always enlarged and slightly
inful to the touch, about three or four days after the appearance of
e pseudo-membrane. The enlargement is usually greatest on the side
ere the inflammation of the fauces is most intense. The surrounding
llular tissue shares in the inflammation, so that the swelling is often
ry great, and impedes the movements of the jaw; it is rarely, how-
er, save in very bad cases, so hard and painful as the corresponding
elling in scarlatina.

Pain and Difficulty in Deglutition.—There is quite frequently no com-
aint of pain in the throat, although, even at the outset, swallowing is
ually somewhat difficult and painful, and pressure behind the angles
the jaw causes a moderate degree of suffering.

As the pseudo-membranous exudation increases, and the submax-
ary glands become swollen and tender, deglutition becomes more
ficult and painful, and, at times, attempts to swallow fluids are fol-
wed by cough and the return of the fluid through the nostrils.

In cases where the false membranes decompose and acquire a gan-
enous aspect, and typhoid symptoms are present, the pain and diffi-
lty in swallowing, if they have existed, are apt to disappear.

iolent cough is excited by attempts to swallow liquids, it usually tes that the epiglottis is inflamed, and the seat of pseudo-memus exudation, which impedes its movements and thus allows the to pass into the larynx. The extension of the exudation to the x is indicated by the cough acquiring a rough croupy sound, gh it often has not the loud clangor of ordinary croup; the respirabecoming sibilant, and the voice weak and hoarse.

hen the false membrane in the larynx is fully developed, the voice most or quite extinct, and the cough, losing its croupy character, mes stifled and less frequent. The respiration is now peculiar; e is constantly a certain degree of dyspnœa, as shown by the fret labored breathing, but there are, in addition, paroxysms of sufion, induced by spasm of the laryngeal muscles, during which the nœa is frightful, and attended with tossing of the whole body and most violent efforts at inspiration.

ath may occur during one of these paroxysms; but usually they ide and are followed by intervals of comparative ease, soon intered by the recurrence of the same alarming phenomena.

he intervals become more and more brief, and finally the patient s into a comatose condition, and dies with all the symptoms of yxia. If, during the violent efforts at respiration which attend e paroxysms of dyspnœa, or owing to the action of remedies, pors of the exudation are dislodged and coughed up, the most urgent ptoms are often immediately relieved. It is, however, but a deful repose, for in most cases the pseudo-membrane re-forms, and the rrence of the croupy voice and sibilant respiration announce that danger of suffocation is again imminent.

favorable cases, however, either when the membrane does not rm, or when it is dislodged as often as formed, recovery may r; the paroxysms of dyspnœa recur at lengthening intervals, finally disappear; the cough becomes gradually more soft, and ments of pseudo-membrane, mixed with muco-purulent fluid, are harged; the voice returns, and the capillary circulation becomes stablished.

some cases, when the exudation has extended through the larynx trachea deeply into the minute bronchial tubes, there is an abe of marked croupal symptoms, and death occurs slowly, after eme dyspnœa and oppression of the chest, with all the symptoms eficient aeration of the blood. These cases occur more frequently dults than in children on account of the larger size of the larynx he former.

he reader is referred for a more full account of this condition to the cle on pseudo-membranous laryngitis.

Nasal Variety.—We have already mentioned that Bretonneau states the disease occasionally begins at the nares, and extends thence in ost insidious manner. More frequently, however, the affection of es is consequent upon an extension of the exudation from the ynx.

r, decompose, become horribly offensive, and impart the appear- of true gangrene.

rousseau has observed this cutaneous exudation in cases where no ction of the throat existed, and has clearly established the identity hese various forms of diphtheria by facts collected in an epidemic he neighborhood of Orleans, where the disease in some persons pre- ted its ordinary features, while in others the exudation occurred on vulva, on blistered surfaces, on the hairy scalp affected with favus, upon ulcers.

The constitutional symptoms which accompany cutaneous diphtheria usually extremely grave and adynamic.

ENERAL SYMPTOMS.—In the mild form of this disease the invasion ften highly insidious; there is usually fever, but the strength and etite are not much disturbed at first. There is at the same time, some, but not all cases, pain in the throat, which may or may not accompanied by difficulty of deglutition. Both these symptoms , however, often very slight, or they may be entirely wanting, a t with which the practitioner should be well acquainted, as this ence of local symptoms by which to explain the cause of the sick- s, gives to the disease, in some instances, a remarkably insidious racter which may well mislead. In one fatal case, at three years age, that came under our notice, there were neither complaints of n, nor difficulty of swallowing, so that the parents had not the least picion of the throat being the seat of disease, though we found it lently inflamed, and covered with deposits of thick false membrane points. On another occasion, we were sent for to see two children o had been sick for four days with slight fever, languor, and loss of etite, but who were not thought to be seriously ill. We found them oring under extensive pseudo-membranous angina, with the early nptoms of croup. They both died a few days later of croup. The nptoms, prior to the development of the croup, had been so mild in h cases as to cause no alarm, and yet the anginose disease had evi- ntly been progressing insidiously for several days. We attended, a years since, for three days in succession, a boy who was attacked ldenly with vomiting and slight fever, loss of appetite and languor, l whom we supposed to be suffering from mere gastric irritation. only local symptom was pain in the chin, and this was not reported us until afterwards. The mother chanced to look into his throat, l, finding there some whitish spots, sent us word. We found him h very considerable membranous exudation, which was fortunately vented from extending into the larynx by proper treatment. Quite quently have we been sent for to see children attacked with croup, l on finding the fauces thickly covered with exudation, have been l that the patient has been ailing for near a week before with lan- or, slight peevishness, loss of appetite, and some little pain in the oat. To this point, the strangely insidious character of the angi- e symptoms in the early stage of many cases, we cannot too strongly ite the attention of the reader. It is one of the very greatest im-omes acrid and offensive when there are false membranes in the nasal assages.

The voice is commonly obscured and nasal, or somewhat hoarse, en when the larynx is not involved.

Cough sometimes exists, and may have a slightly ringing spasmodic aracter, due to mere irritation of the larynx, though it usually re- mbles in sound that produced by the action of hawking, rather than common cough.

In a very small proportion of the cases, an eruption, resembling that scarlatina, appears at irregular periods in the course of the disease. appears, however, that this eruption lacks the punctated appearance the scarlatinous rash; does not appear at any fixed day of the dis- se; is irregular in its progress, and is not followed by desquamation. The reports of it are, however, scarcely numerous or accurate enough enable us to say positively that intermingled cases of scarlatina have t been mistaken for diphtheria, or that the two poisons may not have en acting jointly.

The further course of these cases varies widely. If the result is to unfavorable, the depression and loss of strength increase rapidly; e surface grows pale or sallow, and is below the natural temperature; e pulse becomes exceedingly frequent and feeble; the fauces assume a ngrenous appearance from decomposition of the false membranes; e swelling of the cervical glands increases, and the patient often fuses to make the effort to swallow, though deglutition is still gener- ly possible; there is a constant fetid discharge from the mouth and strils; the breath is horribly offensive; and death ensues amid the ost profound prostration. Or, at a much earlier period of the dis- se, the fatal event may be precipitated by the extension of the exu- tion to the larynx.

If, on the other hand, the case tends toward recovery, the false mem- anes become detached and thrown off, the strength improves, the lse becomes fuller and stronger, and the appetite returns. Even in vanced convalescence, however, there is serious danger, as will be en more fully hereafter, of the occurrence of troublesome or even tal sequelæ.

In a still more severe group of cases than those above sketched, the mptoms are of the most asthenic or malignant type.

In these cases the anginose affection, though it may be severe, rarely tracts much attention. The pseudo-membranes in the fauces are soft d pulpy, and, when examined microscopically, highly corpuscular d granular; they soon decompose, and become discolored by the ood which exudes from the mucous membrane. There is, moreover, strong disposition for the exudation to extend to the posterior nares, to appear on various portions of the external cutaneous surface. he breath and the discharge from the mouth and nostrils are indescri- ably fetid. In some cases true ulceration, and even gangrene, of the uces occurs. There is, however, less pain complained of, and less in- sposition to swallow than in many lighter cases, owing probably to

his disease even more than in many others, to persevere to the very
st moment in the judicious application of suitable remedies.

t is as yet impossible to arrive at any plausible estimate of the
rage mortality of diphtheria, so widely does the proportion vary in
ferent epidemics. Neither sex nor temperament appear to have any
luence upon the result; but extreme youth undoubtedly renders the
ognosis much more grave.

The prognosis in the secondary form of diphtheria is also more unfa-
rable than in the primary.

DIAGNOSIS.—We have already sufficiently dwelt upon the general
mptoms and local signs which enable us to detect diphtheria, in every
stance, after the disease has fully developed itself.

In examining the fauces in the early stage of the affection, it is well
remember that in simple angina, the crypts of the tonsil-glands occa-
nally become so distended by their secretion as to present the ap-
arance of small, round, and slightly elevated whitish patches, which
ght readily impose upon a hasty observer for pseudo-membranous
posits.

In regard to the value of the peculiarities upon which a differ-
tial diagnosis between diphtheritic croup and idiopathic primary
embranous croup is so frequently based, we have fully expressed our
inion in the article on the latter disease, to which we would refer the
ader.

Diagnosis from Scarlatina.—The great resemblance which at times
ists between the anginose symptoms of scarlatina and diphtheria has
d some authors to suggest that they are identical diseases, and the
llowing further points of resemblance have been adduced: the two
fections prevail frequently simultaneously in the same region, and
en in the same family; in certain cases of diphtheria, a rash, very
milar to that of scarlatina, is said to appear; and the urine, in diph-
eria, is frequently albuminous. That this similarity is, however,
ore apparent than real, is evident from the following considera-
ons.

1. Although in some epidemics of diphtheria a rash is said to have
en occasionally noticed, its occurrence is at most the rare exception,
stead of the almost invariable rule, as in scarlatina; it differs, too,
om that of scarlatina, in appearing at irregular periods, in being par-
al, appearing suddenly in patches, not deepening gradually in inten-
ty, and in being of a uniform erythematous redness, without the punc-
ted appearance peculiar to the scarlatinous eruption.

2. The albuminuria of diphtheria presents these distinctive features
s compared with that of scarlatina, that there is not always any dim-
ution in the amount, nor any constant change in the character of
he urine when it is present; that it occurs in the early part of the at-
ack, and increases as the disease approaches its height, or may disap-
ear suddenly, even in the early part of its course; that although usu-
lly noticed in severe cases (and probably a very unfavorable symptom),

there seems to be no necessary connection between the urine becom non-albuminous and the disease assuming a milder type.

3. There is a wide difference in the sequelæ which succeed the affections; dropsy scarcely ever following diphtheria, while vari paralytic phenomena, which are rarely noticed after scarlatina, are frequent occurrence. It is very much more common, also, to have s puration of the glands of the neck after scarlatina.

4. In the same way, endocarditis, though it has recently been notic in a few cases of diphtheria, is much more frequent in scarlatina.

One of the most positive proofs of the essential difference of the two affections is the fact, attested by universal experience, that th exercise no protective power whatever against each other, and that i dividuals whose systems are protected against a second attack of sc latina, are fully as likely to contract diphtheria as those who have ne suffered with either of these diseases.

It may also be added that second attacks of scarlatina are very ra while they seem to be much more common in diphtheria.

It seems evident to us, therefore, that in the present state of our formation upon this subject, scarlatina and diphtheria must be regard as entirely distinct affections, although presenting quite numerous poi of singular resemblance.

COMPLICATIONS AND SEQUELÆ.—*Albuminuria.*—We have already brie alluded to the peculiarities of the albuminuria of diphtheria, but the i portance of the symptom merits a more full discussion.

The occasional presence of albumen in the urine in cases of diphthe was first noticed by Mr. Wade in 1857, who also found associated wi the albumen, tube-casts and renal epithelium. It was shortly aft wards recognized by MM. Bouchut and Empis[1] in thirteen out of fifte cases; and since then has been found, in a varying proportion of cases, by many observers in different epidemics.

The character of the urine when it contains albumen is not consta but usually it is quite pellucid, of acid reaction, and apparently free fr any deposit; although, on standing, both tube-casts and epithelium m settle to the bottom. The quantity also varies considerably, Hill having found it much diminished, while, according to West and Wa it frequently remains normal.

The amount of urea excreted is usually increased in diphtheria, a according to Sanderson, the presence of albumen and tube-casts in urine is not necessarily associated with any interference in its elimi tion, but this does not agree with the examinations of others, who ha found a diminution of the solid excreta when albumen was present.

The quantity of albumen varies much, being at times a mere tra and again being present in large amount. The kinds of tube-ca noticed by Wade, and which are the ones usually found, were sm waxy casts; casts of a similar size, but granular, probably from cing disintegration, and ordinary epithelial casts, and fibrinous es.

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[1] De l'Album. dans les Mal. Couenneuses, Compt. Rendus, 1859.

lbuminuria in diphtheria occurs at various stages of the disorder—ome cases even during the first few days. It not rarely comes on diously, and may manifest its presence by no peculiar constitutional nptoms. There can be, however, little doubt of the grave import of appearance, though as yet its exact significance has not been accu- ely defined.

t is indeed true, that it has been found in large quantities in cases ich have preserved a mild character throughout (Sanderson); but on other hand, Bouchut and Empis regard it as a highly unfavorable n, coinciding with very great gravity of the disease; and Wade be- es that the quantity of albumen is usually in direct proportion to the ention of effete material, and that indications of impairment of the al function are almost constantly precursors of an unfavorable termi- ion.

Hillier (*op. cit.*) examined 38 very severe cases in regard to this point, found albumen present in 33, 32 of which proved fatal, while of the ee from albuminuria, all recovered.

The albumen appeared in 1 case on the fourth day, in 3 on the fifth , in 2 on the seventh day, in 5 on the ninth, and in 1 each on the rteenth and nineteenth days. Usually the albumen disappears from urine as the severity of the symptoms diminishes, but Bouchut has own it to persist after convalescence, and finally produce, as in Bright's ease, anasarca and hydrothorax.

Heart-clot.—The formation of coagula in the cavities of the heart ing life has been noticed in many conditions of the system; and this rible, because almost necessarily fatal accident, is now always dreaded the course of several diseases, of which diphtheria is eminently one.

There have even been epidemics of an unknown nature, but where only discoverable lesion have been enormous fibrinous concretions the heart. Such epidemics have been recorded by Huxham, Chisholm, d recently by Armand.[1]

The symptoms mentioned by these authors as significant of this acci- nt are, pain at the pit of the stomach; difficulty in respiration; ex- me anxiety and restlessness; anxious expression and depression of rits; slight, dry, and rather spasmodic cough; the face being at times d, and the surface dry and inclining to be cool, with coldness of the remities. The pulse was small and irregular, and, in some of mand's cases, an abnormal murmur was detected in the heart; there s usually considerable dulness over the cardiac region; the respira- y murmur remained pure and quite full, and the chest normally sonant.

According to Robinson, the first observation of sudden death in diph- eria from the formation of heart-clot was made by Dr. Werner, of nz, in Austria, in 1842; and the second by Winkler, in 1852.

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[1] Des Concretions Fibrineuses et Polypiformes du Cœur, 1857.

In England, Dr. Richardson[1] appears to have been the first attention to the difference between these symptoms of embarrass culation and those of obstructed respiration, as met with in diphtl croup.

His account of the symptoms of the former condition agrees c with that given above as to the coolness and almost marbly pal the surface; the moderate lividity of the face; the constant re ness and intense anxiety; the feeble, quick and irregular action heart, with a muffled character of the sounds, and in some cas abnormal murmur. He also calls attention to a peculiar promi of the anterior part of the thorax in very young children, whi believes to be strictly diagnostic of fibrinous obstruction.

In obstruction of respiration, on the other hand, the surface bec livid, the veins turgid, and the muscles are often convulsed; the h sounds are clear, though feeble, and the breathing is the first to at death, instead of the circulation, as in the other case.

In three cases occurring in the practice of one of ourselves,[2] in we were able to diagnosticate the condition, death took place o twenty-first, twenty-fifth, and twenty-eighth days respectively each case the local symptoms had given way and almost disapp and the children seemed to have entered upon convalescence, slight but steadily increasing signs of circulatory embarrassmen came perceptible, and after a few days battling against the cons increasing obstruction, the little patients each died as though wor by the unequal struggle.

In no case was there any evidence of any other organ being cated; one of the cases was, however, complicated with albumin

The pulse was not noted to be over one hundred; the cardiac s were unattended with murmur, but confused, indistinct, and seem though reduplicated.

There was no marked paralysis, but in one case partial paralysi in another marked muscular debility.

At the autopsy, in each case, the right side of the heart was f clots, which were either dark-colored, with whitish spots, or yello white throughout, quite firm, and adherent to the endocardium appeared to have been forming for several days. In one case, a c the left ventricle presented at its lower extremity a broken, irre uneven, and frayed or granulated appearance, as though the di grating process by which thrombi are broken up, had commenced In none of the cases were there any evidences of endocarditis. same accident has been observed during the past ten years b Barry,[3] Mr. H. Smith,[4] and Mr. C. R. Thompson,[5] and in a va esis published recently[1] by Dr. Beverley Robinson (now of New York), n cases are fully described, in at least five of which the ante-mortem rmation of clots occurred.

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[1] Med. Times and Gaz., March 8, 1856; British Med. Jour., Feb. 16 and A 1860.

[2] Dr. J. F. Meigs, Am. Jour. Med. Science, April, 1864, vol. xlvii, p. 305.

[3] British Med. Jour., 1858.

[4] Med. Times and Gaz., Dec. 17, 1859.

[5] Med. Times and Gaz., Jan. 7, 1860.

The symptoms which he deduces, from a careful analysis of his own d the other recorded cases, as indicative of this condition are: cool- ess of the extremities, pallor of the face, prostration, anxiety, agita- on, and peculiar intense dyspnœa; associated with a feeble pulse, dull, eak, and veiled heart-sounds, and frequently with the signs of emphy- ma of the lungs.

Most of the cases have occurred in young subjects, and the clot has rmed late in the course of the disease, or even after convalescence s begun. The cause of this deposition of fibrin is not very apparent; our article on this subject, already referred to, it was suggested that e coagulation might depend upon some peculiar change in the tissue the endocardium, analogous to that which gives rise to the diph- eritic exudation on mucous surfaces.

No such alteration has, however, as yet been detected, and Dr. Rich- dson, to whom the profession is so much indebted for his investiga- ons upon the coagulation of the blood, attributes it, in this case, to a ficiency of the volatile agent which retains the fibrin in solution, gether with an actual increase in the amount of the fibrin of the ood, this combination producing the most favorable condition pos- ble for fibrinous deposition.

Endocarditis.—Although in the above cases no lesion of the endocar- um has been found, Mr. Bridger (*loc. cit.*) and others have noticed flammation of this membrane quite frequently in diphtheria. It has ually appeared late in the course of the disease, and has been attended th pain in the præcordia, frequent pulse, hurried respiration, an anx- us countenance, with in some cases a systolic murmur. In fatal cases, ere was found a roughened, reddened, thickened appearance of the lves, as if due to interstitial deposit. In some cases, also, a granular fatty degeneration of the muscular fibres of the heart has been ob- rved, as by Bristowe, Hillier, Robinson, and others.

Paralysis.—One of the most frequent and important, and certainly e most peculiar of the sequelæ of diphtheria, is the occurrence of ralysis. It originally attracted the attention of MM. Trousseau, La- gue, and Faure, under the form of difficulty of deglutition, and a nasal aracter of the voice; but since then has been observed in the most ried forms and degrees, affecting both general and special sensation d the power of motion. In most cases, every trace of the primary sease has disappeared before any paralysis is noticed; the patient eeps, eats, and digests well, yet many cases emaciate, and there is ten marked pallor of the surface. In many instances, also, especially children, there is great irascibility or irritability of temper.

Most frequently a nasal character of voice and regurgitation of liquids rough the nose are the first symptoms to call attention to the disease, though these may be preceded by some slight difficulty in articulati or by alteration of the sense of taste at the back of the tongue. examining the fauces the soft palate is found hanging relaxed, and it be pricked, there is no contraction of it, nor does it give the pati pain.

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[1] De la Thrombose Cardiaque dans la Diphthérie. Paris, 1872.

At times but one side is paralyzed, and the uvula is drawn toward the sound side. The affection may extend no further than the fauces and soon disappear; or it may advance, the eye usually becoming ne affected, following the throat affection, and preceding any paralysis the limbs. The impairment of vision is rarely of long duration, lastin from a few days to two months, and is of every grade, from mere inability to read fine print to perfect blindness.

Dr. Greenhow has noticed that the pupils become dilated, and a sluggishly under the influence of light, for a day or two before the sig becomes sensibly impaired, and may remain so for a time after sig has been regained. He has also observed that patients who were unable to read with unassisted sight could do so with the aid of conve glasses, so that he attributes the impairment of sight to paralysis the ciliary muscle and temporary loss of the adjusting power.

In addition to this want of accommodation, however, depending paralysis of the ciliary muscle, Bouchut believes that there is in man cases, and especially in those who have had albuminuria, a serous infiltration of the fundus of the eye, due to the anæmic condition of th blood, and which may impair the nutrition of the optic nerve, and eve lead to its atrophy.

The following case, which came under our observation recently, the clinic at the University of Pennsylvania, affords an interesting illustration of the peculiarities of this form of paralysis. The ophthalmi examination was made by Dr. S. D. Risley, who has kindly placed th results at our disposal.

Case. Emma W., æt. 7 years, suffered with an attack of sore throat, the natur which was not recognized by the physician in attendance. It was quite severe, accompanied by marked swelling of the glands at the angles of the jaws, and compelled her to be confined to bed for a week or ten days. Soon after convalescence began, it was noticed that her voice became altered, and that she occasionally regurgitated fluids that she attempted to swallow. Her general health improved, howev and in a few days she returned to school, which she was soon obliged to quit in consequence of rapidly increasing inability to read, on account of the print seem blurred and "the letters running together."

Two weeks later, or about five weeks from the time of the first attack, examinati of the eyes showed the fundus of both eyes entirely healthy. *O. D.*, $V = \frac{20}{xx}$. Acute of vision, as determined by Snellen's types, normal, and she can read Jr. No. 14 at 2 *O. S.*, $V = \frac{20}{xxx}$, and she reads Jr. No. 16 at 2′. *O. D.* emmetropic; *O. S.* hypermetropic $= \frac{1}{45}$. With glasses $+ \frac{1}{12}$ (convex glasses with 12″ focus) *O. D.* reads Jr. N 1 at 12″, *O. S.* at 14″. The pupils react promptly to light.

She was directed to wear $+ \frac{1}{12}$ glasses for near work, and strychniæ sulph., gr. was ordered four times daily. This was in a few days increased to five times a and its use was followed by prompt improvement, so that in less than two week power of accommodation was entirely restored.

eafness may follow this amaurosis; then the lower limbs become ected, the patient becoming paraplegic, and next the upper extremi- s; then the muscles of the alimentary canal and bladder, causing paction of the rectum with fæces and retention of urine, or the hincters of these organs alone may be involved, and lead to involun- y discharges. Finally, the muscles of the trunk, including those of spiration, may become paralyzed, and in some very rare cases even e muscles of the heart are involved. It is stated that the paralysis the extremities is never strictly unilateral. The paralysis is rarely nfined to loss of motion, but, in a majority of cases, sensation is her much modified or lost; and indeed in some instances there has en no loss of motion, the sentient nerves alone being affected. In her cases the sensibility has been found exalted, or there has been in e same case hyperæsthesia in the upper, with anæsthesia in the lower tremities.

The paralysis, whether it be of motion or sensation, is progressive and adual, even in the same set of muscles, and usually involves one limb fore it extends to other parts. The mind, though often feeble and ll, acts correctly in most cases.

During the continuance of these phenomena, the appetite may remain od and digestion easy; but there are often marked evidences of the ntinuance of some morbid action in the economy. The surface is of earthy, sallow hue, calorification is often imperfect, and the circula- n is much depressed, the pulse being small, weak, and much reduced frequency.

In some cases, indeed, the affection runs on to a fatal issue, usually nsequent upon a failure of one of the vital functions of circulation or spiration. M. Faure has given a vivid picture of these sequelæ in eir worst form, when the patient, paralyzed, indescribably prostrated, th imperfect speech and power of deglutition, impaired vision, imbe- ity of mind, œdema, and even gangrene of the extremities, finally es in some fainting fit, or passes away almost imperceptibly.

The result of diphtheritic paralysis is, however, favorable in a large ajority of cases; thus of 77 cases collected by Dr. Reynolds, but 9 ere fatal. The duration is, however, more uncertain, varying from e or two weeks to several months, the mean duration being about a onth.

It is as yet impossible to advance any satisfactory explanation of the use of these grave paralytic sequelæ. They occur probably in one- urth of all cases, in greater or less degree, and are noticed with at ast equal frequency after mild as after severe attacks.

At first, indeed, the faucial paralysis was attributed to some such cal cause as inflammation of the sheath of the nerves supplying these rts, and Greenhow still contends that the nerve affections bear some oportion to the local severity of the attack, the paralysis and anæs- hesia being more complete on that side of the fauces which has been ost severely affected by the primary disease; but we have been able satisfy ourselves that this does not occur with any uniformity. Charutility of all local treatment has been questioned on the ground t the throat affection is merely a local evidence of the constitu- nal disease, and that the disease rarely kills save by involving gans beyond the influence of such agents. Still, on the other hand, ere are eminent authorities, as Trousseau, who assert that topical plications are the most successful and important remedies in diph- eria.

The great objects to be held in view in the local treatment, are to or the separation of the pseudo-membranes, and to prevent their ex- sion from the fauces into the larynx and nasal passages.

LOCAL TREATMENT.—The most important of the local remedies are cluded in the lists of astringents and caustics.

Of these, nitrate of silver has probably been used more than any her substance for many years past, and is highly recommended by M. Bretonneau, Valleix, Grisolle, Rilliet and Barthez, Trousseau, est, and many others.

It is employed both in solution and substance. The latter form is, wever, open to the objections, that if the extent of the false mem- anes be at all considerable, the solid caustic can seldom be applied to ore than a small portion of it, and that it is attended with the risk slipping from the porte-caustic into the pharynx, and thence passing to the stomach.[1] The solution is therefore generally preferred. M. retonneau advises its employment in the proportion of half an ounce the salt to an ounce and a half of water; and West employs a solu- on of the strength of a drachm to an ounce.

We have usually made use ourselves of a solution of ten or twenty grains the ounce, and have found it abundantly strong. It may be applied ther by means of a piece of sponge fastened upon a proper handle, hich is the best method, or a camel's-hair pencil, nearly as large as e end of the little finger. The application should be made once, wice, or even three times in the course of the twenty-four hours.

Hydrochloric acid is also frequently employed, either pure or diluted ith from one to ten parts of honey; the more dilute forms being used the case of children.

It possesses the great advantage over the other mineral acids, that s caustic action does not extend much from the point of application, ut is open to the objection of causing a white plastic exudation on any art of the mucous surface, not covered with false membrane, with hich it may come in contact, which may lead the physician into ror.

When the limits of the pseudo-membrane can be seen in the pharynx, llowing M. Bretonneau's advice, the acid may be used more concen- rated, and the sponge, after being dipped into the acid and squeezed so mmended are solutions of lime, potassa, and soda; solution of chlo- ed lime; of chlorate of potash or soda; of permanganate of potash; omide of potassium; of pepsin; and of dilute lactic acid.

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[1] Dr. Geddings recommends, when it is desirable to use the solid nitrate, to reduce t to powder, and to roll the sponge probang, previously moistened with mucilage of um arabic and squeezed, in the powder until a sufficient quantity adheres, and to pply it thus prepared to the diseased parts.

r. Jacobi (*Amer. Jour. of Obstet.*, May, 1868, pp. 13–65), has pub- d an analysis of the relative value of these solvent applications. ording to him, lime-water requires four to ten hours to thoroughly efy soft diphtheritic exudation; while for firm pseudo-membranes, it iires from thirty to seventy-two hours. Potash and soda, and their s, act more slowly; and the one other application which he recom- ids as equally rapid in its action is a solution of bromine gr. j, bro- e of potassium gr. j, in fʒvj of water.

e have carefully tested the latter solutions, as well as those men- ed above, and from the results of repeated tests, have concluded lime-water is the most powerful in its solvent action upon pseudo- nbranous exudations. We have frequently found, when fragments irm white exudation have been placed in lime-water at a tempera- even lower than that of the buccal cavity, that the exterior began very short time (half an hour) to undergo disintegration, and that whole fragment was reduced in a few hours to a granular putri- . It is, however, undoubtedly true that this effect will be pro- ed with very different rapidity upon different specimens of pseudo- mbrane.

here is no real difficulty in making use of any of these applications, he children be properly managed. One or two assistants must hold patient in such a way that the head shall be thrown backwards, l the hands and feet secured. The physician must depress the tongue th the handle of a spoon held in the left hand, while he holds in the ht the pencil or sponge mop. If the child refuse to open the mouth, an generally be made to do so by holding the nose in order to force it breathe through the mouth. If this fail, all that is necessary is to ss the handle of the spoon against the teeth, when the patient will n become too much fatigued to offer further resistance.

argles.—When the patient is sufficiently old and intelligent to be to use gargles thoroughly, any of the substances which have been mmended as local applications may be thus used, being of course ely diluted. Thus tr. ferri chl., hydrochloric acid, sol. sodæ chlori- e, in the proportion of fʒj or fʒij to f℥vj, or chlorate of potash in ng solution, may be used as gargles with much advantage in some s.

hese solutions may also be very efficiently applied to the throat in nely divided condition, by means of the steam or hand-ball atom- ; a mode of application which is peculiarly useful in cases where the do-membrane has extended to the larynx.

very convenient and ready application, and one from which we obtained marked advantage in several cases, especially where the dation had extended to the larynx, is by covering the patient's l with a sheet, and introducing a vessel containing slaking lime, so the steam may be freely inhaled. It is probable that the chief

ent, abandoned as indefensible either in theory or practice, and all
ts are directed to promoting the nutrition of the patient and sup-
ing the strength of the system, as indicated by the marked ten-
cy to prostration, the feeble pulse, and the manifest deterioration
he blood.

t is probable that those cases in which bloodletting and the admin-
ation of mercurials were adopted with such apparent benefit, were
er erroneously considered diphtheritic, or that the disease, when
urring sporadically, as it formerly did, was of a far more sthenic
e than it has presented of late years.

egarding diphtheria as a constitutional affection, depending upon a
uliar alteration of the blood, we must admit that we are in posses-
n of no remedy which in any respect merits the name of a specific
ts treatment.

mong the best internal remedies, however, are the various prepa-
ions of chlorine, iron, and bark, which may be given singly, or, pref-
bly, in combination.

hus there are no remedies of more uniform and marked advantage
n sulphate of quinia and tincture of the chloride of iron, given in
doses at short intervals. Hydrochloric acid or chloric ether may
added to these tonics, and this combination is strongly recommended
West and other high authorities.

The Sanitary Commission, in London, reported very strongly in favor
a mixture containing tincture of the chloride of iron, with chlorate
potash, chloric ether, and hydrochloric acid, sweetened with syrup;
l doses being employed according to the age of the patient, and fre-
ently repeated. This combination has been, by Gibb, rendered still
ore stimulating by the addition of muriate of ammonia.

Oil of turpentine has been recommended (Dr. Perrey, *Med. Times and*
z., March 5th, 1859) in large doses, both for its stimulating effect,
d from its tendency to promote the absorption of lymph in adynamic
tes of the system, where mercury cannot be given.

hlorate of potash, given in Huxham's tincture of bark, has been
nted as almost specific in the treatment of diphtheria; but, as re-
rked by West, it unquestionably fails to produce here those excel-
effects which are obtained from its use in ulcerative stomatitis.

ermanganate of potash, which has been so extensively used of late
rs in zymotic diseases, has been used both locally and internally in
affection, but apparently without any very positive advantage.

metics; Purgatives.—Emetics are useful when the exudation shows
sposition to extend to the larynx, or when there is much difficulty
reathing from tumefaction of the fauces, or from accumulation of
pseudo-membranous deposits. We would recommend under these
umstances the use of alum or ipecacuanha, as recommended in the
cle on pseudo-membranous laryngitis; the emetic being repeated in
or twelve hours, if the same indication should continue or recur.

purgative dose is useful at the commencement of the disease, tively required.

In cases where such adynamic symptoms are pres
begin early in the attack with the administration of t
uli, and employ the stronger forms as the disease ac
strength of the system succumbs more and more.

Food.—In no disease should more sedulous care be
to the patient a proper amount of suitable nourishme
in the absence of any remedy which can be looked upo
specific, we must assign, perhaps, the most important p
ment of diphtheria to food and stimulants. It is at le
where these cannot be administered in proper quantity
ment is unavailing, and hence it is our duty, upon findi
and fatigue experienced by the child when forced to tak
of medicine make it utterly unwilling to take food,
strictly medicinal treatment, and trust to sustaining th
system by the free use of stimulants and concentrated

In cases where mechanical obstruction exists, or wh
voluntary deglutition are obstinately resisted from f
pain caused by the act, nutritious and stimulating en
immediately resorted to. These may consist of beef
up in milk, brandy in the form of milk-punch, and,
medicated by the addition of quinia. They should be g
or four hours, in rather small quantity, and not so con
irritate the bowel. When thus administered it is quite
tain life for several days, until food can again be intr
stomach.

In addition to the local and general treatment abov
the patient should be rigorously confined to bed during
ment, and for at least ten days after the disappearance o
This caution is given, not only on account of the dang

ured; and on account of the positive, though perhaps slight, conta-
ousness of diphtheria, it is wise to practise separation of the well chil-
en in the family from the sick.

The treatment required in those cases where the pseudo-membrane
tends into the larynx, and especially the discussion of the indications
r the operation of tracheotomy, will be found in detail in the article
pseudo-membranous laryngitis.

Treatment of Paralysis.—We have already stated that the prognosis
diphtheritic paralysis is usually favorable, the symptoms often dis-
pearing in the course of time without treatment. The cure may,
wever, be much hastened by a persistence in the administration of
n and quinia, to which strychnia may advantageously be added.

Nitrate of silver has also been employed in full doses with apparent
nefit.

The paralyzed muscles should be faradized daily; and, when acces-
le, sea-bathing or sulphur baths may be employed with advan-
ge.

In those cases where the muscles of deglutition are especially af-
ted, and the nutrition of the patient is suffering from his inability to
allow sufficient food, it is desirable to resort to the use of nutritious
emata.

Treatment of Heart-Clots.—Under the supposition that the blood is
perinotic in the latter stage of diphtheria, the various salines, especi-
y the vegetable ones, such as the citrates and acetates, and ammonia,
en either as the carbonate or in the liquid form, have been recom-
ended by Richardson.

When, however, the symptoms indicate that deposition of fibrin has
solutely occurred, it is probable that nothing can be done in the
ay of curative treatment. Alkalies may be given internally, the
por of ammonia inhaled, alkaline solutions injected into the veins,
t there is little reason to hope that any effect upon the clot can be
oduced.

In one of the cases reported by us (*loc. cit.*), the clot presented at
e extremity a granular, partially disintegrated condition, as though
s removal had begun by interstitial action, and the mechanical effects
the blood current; and it is possible that by supporting the powers
nature the removal of the clot might be effected in this way. Indeed,
ere are cases on record (quoted by Robinson, *loc. cit.*) in which the
mptoms have most clearly demonstrated the existence of a clot in
e cavities of the heart, where still recovery has occurred.

ARTICLE III.

MUMPS.

DEFINITION; SYNONYMS; FREQUENCY.—Mumps is an acute febrile spe-
fic disease, contagious and epidemic; occurring but once in an indi-

vidual; attended by an inflammation of the parotid and sometin the submaxillary glands, with a tendency to metastasis to the te in males and to the mammæ, vulva or ovaries in females; and a invariably resulting in recovery.

Some authors, as Niemeyer, object to classifying mumps with stitutional diseases; but the fact that it undoubtedly possesses th tures enumerated in the above definition, and which, in the pr state of our knowledge, must be regarded as specifically characte of that class of affections, seem to us to fully entitle it to be incl with the other general diseases.

Mumps is known under a variety of names in every language. terms usually employed to designate it by English and Ame authors are cynanche parotidea, parotitis, parotiditis, and inflamm of the parotid.

It will be impossible to obtain any definite idea as to the frequ of this affection, until the system has been introduced of regist not merely deaths but all cases of disease, since mumps is scarcely fatal. Its frequency is, however, known to vary very widely in d ent years, owing to epidemic influences; so that while in certain we do not meet with a single case, in others we are called to a con able number.

CAUSES.—Nothing is known in regard to the essential nature o cause of mumps. The disease is, however, unquestionably contag and it quite rarely happens that one member of a family sickens mumps, without some of the other children being attacked.

Mumps rarely occurs as a *sporadic* affection, but appears, as alr stated, in *epidemics* of varying extent and severity, at times limited to a single locality or even a single institution, and at o affecting large cities or districts.

Season appears to exert a powerful influence upon the develop and activity of the specific poison of mumps, since the epidemics nearly always in the spring or autumn. According to Vogel, it is to be endemic on the damp coasts of Holland, England, and Franc

Age also exerts an unquestionable influence, by modifying the su tibility to the contagion of mumps. Thus the disease is far most mon between the ages of seven and fifteen years; whilst it is al unknown before the end of the first year, comparatively rare betw the ages of one and five years, and, on the other hand, quite rar adults.

Although it appears certain, however, that the susceptibility to contagion of mumps diminishes with each succeeding year after the of fifteen, we must in great part explain the rarity of the diseas adult life, by the fact that a large proportion of people have had childhood, and are thus protected against a second attack.

Second attacks of mumps are indeed of extreme rarity.

ANATOMICAL APPEARANCES.—Opportunities very rarely occur fo examination of the parotid glands in mumps, since this disease is scar

r fatal. Virchow,[1] who has shown that, in cases of symptomatic sec-
dary parotitis, the affection starts in the gland-ducts, maintains that
e idiopathic form occupies the same seat. Bamberger,[2] on the other
nd, states that the whole gland appears enlarged and reddened, with
tissues swollen and flaccid, owing to an interstitial exudation of
mph. The softness and indolent character of the swelling, however,
e fact that it usually extends beyond the borders of the gland, and
s usually rapid and complete subsidence, all induce us to believe rather
at there is slight catarrh of the ducts, with mere œdema of the inter-
itial and surrounding connective tissue.

It is only in rare and very severe cases that there is sufficient lymph
fused to undergo organization and lead to persistent increase in the
ze of the gland, or to so compress the ducts as to induce atrophy of
e true gland tissue. In even more rare cases, it is said that suppura-
on may occur.

SYMPTOMS.—In some cases the attack of mumps is preceded for a day
r two by slight prodromes, consisting of restlessness, feverishness, loss
f appetite or vomiting; in excitable children, symptoms of nervous dis-
rbance may occur. More frequently, however, the local symptoms
ppear simultaneously with the fever, and we have generally found
ositive swelling of the parotid gland upon our first visit to the child.

The earliest local symptom is often pain, complained of under the ear,
nd increased by pressure and by all movements of the jaw, as in mas-
ication. There is also stiffness felt in opening the mouth. The swell-
ng appears first immediately beneath the ear; the depression between
he mastoid process and the ramus of the jaw quickly becomes filled,
nd the swelling rapidly extends on to the cheek and neck. At first
he swelling is flat, indurated, and presents the outlines of the parotid
gland; but it soon becomes prominent, the most marked projection
sually being observed immediately anterior to the lobe of the ear, and
xtends beyond the limits of the affected gland. The central part of
he swelling corresponding to the parotid, remains firm, indurated, and
more or less elastic, while at the periphery it is softer and often pits on
ressure. The degree of enlargement varies much in different cases,
eing at times moderate and confined to the parotid region, while in
ther cases, it extends over a large part of the neck and face, and may
e so great as, especially when both glands are affected simultaneously,
give to the head and neck a pyramidal shape.

Quite frequently the submaxillary glands are involved, and the swell-
g consequently extends along the base of the jaw; in more rare cases,
he enlargement is most marked in this region, or, indeed, the sub-
axillary glands may be almost exclusively the seat of the affection.

The skin over the seat of enlargement is at times scarcely altered in
lor, or may present more or less marked redness. There is usually
ly very moderate tenderness on pressure. The pain suffered during
e attack varies greatly; in some cases it is merely a marked sense of

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[1] Quoted by Niemeyer (op. cit., vol. i, p. 486).

[2] Quoted by Vogel (op. cit., p. 113).

ced, and at times referred to a metastasis to the membranes of the
in. There is, however, no actual meningitis present, and upon the
evelopment of the external swelling, these nervous symptoms dis-
ear.

Prognosis; Duration; Course; Termination.—Idiopathic paroti-
or mumps almost invariably terminates favorably. The duration of
case varies from four or five days in very mild cases, to ten or
elve in severe ones. As already stated, the inflammation usually ter-
nates in complete and rapid resolution. In some cases, however, a
ger amount of lymph is formed in the interstitial tissue of the gland,
dergoes partial organization, and causes a hard, painless swelling,
ich persists for some time. In some epidemics, suppurative degen-
ation of the gland has been noticed, and the abscess which formed
s either opened outwardly or into the external auditory meatus.

Diagnosis.—The acute febrile character of the affection, and the pe-
liar seat and shape of the swelling, always serve to render the disease
adily recognizable.

Treatment.—As mumps almost invariably runs a favorable course,
e treatment should be of a mild and expectant character.

The child should be strictly confined to bed; the diet should be fluid,
rtly on account of the great difficulty in mastication, light and diges-
le, consisting chiefly of preparations of milk and light animal broths.
e only internal remedies required are febrifuges, such as spirit of
rous ether and solution of acetate of ammonia, with a free supply of
ter and acidulated drinks; occasional laxatives; and, if there is
plessness, small doses of Dover's powder or some other anodyne.

ocal applications appear to have little or no influence upon the
rse of the swelling. The only ones to be recommended are warm,
t poultices, or light water-dressings, covered with oiled silk, which
not annoy the child, and tend to favor resolution. If the induration
marked and extensive, so as to threaten suppuration, it has been
ised to apply a few leeches behind the angle of the jaw. If it
uld become evident that suppuration has occurred, the abscess
uld be opened immediately, and the discharge favored by the ap-
ation of poultices, in order to prevent further destruction of the
nd or perforation of the external auditory meatus. In cases where
uration and enlargement of the gland persist, absorbent applica-
s, such as inunctions of iodine or mercury, should be made over the
nor.

n cases where alarming symptoms of depression and cerebral dis-
bance make their appearance after the sudden subsidence of the
otid swelling, the effort may be made to redevelop the external in-
mmation by stimulating applications to the surface, and by the inter-
administration of nervous and diffusible stimulants, such as ammo-
musk, or brandy.

After the acute symptoms of the attack have subsided, and the child
fully entered upon convalescence, we would caution against allow-
it to leave bed too soon, since we have occasionally observed such

premature exposure to be followed by marked febrile sequelæ. Th in one case, occurring in an adult, there was marked fever lasting for week; in another case, in a child, there was high fever for ten day and in a third case, also in a child, there was most obstinate and vi lent vomiting for four days; so violent, indeed, that we feared lest som renal complication might have been developed; on examination, how ever, the urine was found to be entirely normal.

ARTICLE IV.

MALARIAL FEVER.

THE propriety of introducing a chapter upon malarial fever in th present work, is shown not only by the fact that malarial disease extremely frequent in children, but also because it presents, as it occur in them, so many peculiarities as to frequently lead to the true natur of such attacks being overlooked.

CAUSES; FREQUENCY.—There are cases upon record in which malari disease appears to have been contracted in utero, and where immed ately after the birth of the infant it has presented unmistakable ev dences of the disease. We have ourselves met with several such case where the symptoms, and the prompt effect of quinine, left no doubt a to the diagnosis. At all periods of childhood, even from the age of few weeks upwards, there can be no doubt that children readily con tract malarial disease on exposure to its cause. Indeed we have me with cases which have shown that the susceptibility of children t malarial poison may be even greater than that of their parents o other adults exposed to the same influences. In children over five o six years old the symptoms of malarial fevers are apt to be almost the same as in adults: the following remarks must therefore be understood to apply especially to those diseases as they present themselves i younger subjects.

SYMPTOMS.—Malaria presents itself in children both in acute an chronic forms. The former occurs both as intermittent and remitten fever. In our article upon typhoid fever we have carefully pointed ou the fact that in children the febrile movement in this latter disease often presents such marked remissions as to have led many authors t confound it with malarial disease, under the name of "Infantile Re mittent Fever." But apart from this, true malarial remittent fever occurs in children, and indeed it is a peculiarity of all forms of malarial disease in early life to present a less marked development both of the paroxysms and of the intermissions. Intermittent fever in children may occur in any of the forms met with in adults, still the quotidian is by far the most frequent, the tertian less common, and the quartan de cidedly rare. Whichever form may be present, is apt to present several

liarities. In the first place, the features of the paroxysms are apt to
nperfectly developed. This is particularly true of the cold stage. It
ery rarely present as a well-developed chill; in some cases, it seems
e entirely absent, but usually can be detected by careful observa-
. The child may merely become pale, seem weaker and more lan-
l, or with this there may be distinct coolness of the hands and
, and blueness of the nails: less frequently is there any discernible
r, and as before stated a fully developed chill is very rare. The
l stage is of short duration, lasting from a few minutes to a quarter
n hour. It is followed by the hot stage, or in some cases the be-
ning of the attack is marked by the appearance of fever. The
ree of this is rarely very high. Sometimes the child, who has been
ely drooping during the earlier part of the day, is noticed to grow
e dull, to wish to be constantly in bed, or on the lap, and its head
hands grow warm, with perhaps some flushing of the cheeks. In-
d, in some cases, the fever is so slight as to pass unnoticed, unless
attention of the nurse is directed to it by the physician. In other
s the accession of fever is more marked; the skin becomes very
, and the cheeks brightly flushed; the child is dull and yet restless;
re is rapid breathing, and marked acceleration of pulse. In some
ldren, the fever is attended with delirium, and it is not a very rare
ng to have it ushered in by a convulsion. The fever lasts a very vari-
e time, and rarely terminates abruptly, as in the case of adults by a
lden defervescence with profuse sweating. Indeed, in many cases,
child seems somewhat feverish during the entire twenty-four hours,
l on careful observation is found to present increase of heat at some
riod of the day, and this is often preceded or followed by a short
riod, during which the child is pale and languid, with cool moist brow
l hands. Added to this irregularity in the symptoms and duration
the paroxysms, is the further source of difficulty, that the accession
fever occurs at very irregular hours. In children of even five years
ge, it may occur at the ordinary time towards noon, but in younger
dren it may appear much later in the day, or even, as we have sev-
l times seen, late in the night.

here are a few other symptoms to be mentioned in connection with
paroxysms. We have already alluded to the occurrence of convul-
s ushering in the hot stage. Frequently the child will vomit what-
r food was in the stomach at the time of the attack. The urine
t is passed during the paroxysm is scanty and high-colored, while
long after the subsidence of the fever, there is apt to be a quite
discharge of limpid urine. Between the paroxysms, if no com-
ation exists, the child may appear merely listless, with scanty appe-
. Quite frequently, however, the disease is attended with some
e marked disturbance, either of respiration or digestion. The com-
ations which we have ourselves most frequently observed, have been
nchitis and pneumonia. In cases where the latter has been present,
seat of the inflammation has occasionally been the apex of the lung.
he *chronic form* of malaria reveals itself in children in the same

way as in adults. No well-marked paroxysms may occur, but the patient has a sallow, cachectic, or anæmic appearance, which of itself is quite characteristic. There is more or less emaciation from interference with nutrition, as the appetite is poor or capricious, and the action of the liver and bowels sluggish and insufficient. Enlargement of the spleen frequently follows, and we have met with well-marked examples of ague-cake in very young children. The blood becomes very poor and watery, and this, added to the obstruction to the circulation through the liver and spleen, in advanced cases may lead to ascites or œdema. We are not aware that the marked development of pigment-granules in the blood, which has been so often observed in the adult, has yet been detected in children suffering with chronic malaria. In some very severe and protracted cases, granular degeneration of the kidneys with albuminuria, and finally uræmia, has seemed to follow in quite young children. Some of the manifestations of malaria which are quite common in the adult, are very rare in children. This applies especially to the various forms of neuralgia, which, as met with in the adult, are so frequently of malarial origin, while we do not remember to have met with a single case of this character occurring in children.

Diagnosis.—It is our belief that malarial disease in children is often not recognized, and that this is due, not so much to its real difficulty of detection, as to the fact that the frequent occurrence of the different forms of malaria in young children, is not sufficiently borne in mind. Undoubtedly also there are difficulties in its diagnosis, which do not usually exist in adults. These arise, as before said, from the irregularity and imperfect development of the paroxysms. Our own experience has taught us in all cases of irregular febrile action, especially when occurring during the spring or fall, without any discoverable lesion to account for it, to suspect the malarial character of the attack. So, too, in cases where some slight lesion or disturbance of function exists, and yet the child seems too seriously and too obstinately ill for the apparent cause, and presents irregular fever with considerable fluctuations, the idea of the malarial nature of the attack should always be entertained. In some such cases, where it is impossible to reach a definite decision from a study of the symptoms, the diagnosis may be made by the therapeutic test of administering full doses of quinia for several days in succession.

Prognosis.—The result of malarial fever is usually quite as favorable in children as in adults, when uncomplicated with any serious local inflammation. All of its forms usually yield readily to specific treatment. The chief source of danger lies in the tendency to severe bronchitis or pneumonia. In protracted chronic malaria, the anæmic and cachectic symptoms have seemed to us to yield to treatment even more rapidly than in the case of adults.

Treatment.—Children, even at a very early age, bear full doses of quinia very well. The amount which we have usually found necessary to arrest an attack of intermittent fever is three grains daily for children of one year of age or under, and one grain additional for each

eeding year, though we have given as much as five grains by the
th in the course of the day to children of ten months, and without
slightest ill effect. It may be administered in the form of powders
aining one-half grain, mixed with an equal amount of sugar and
lered extract of liquorice, repeated as necessary, and given at such
s as to bring the system thoroughly under the influence of the
before the hour at which the accession of fever has been noticed.
e children, however, will not take the powders without difficulty or
ea, and the quinia may then be given merely suspended in syrup
ed orange, or in the following combination:

℞.—Quiniæ Sulph., ... gr. xxiv.
Acid. Sulph. Diluti, ... gtt. xxx.
Syr. Zingiberis, Syr. Simplicis, Aquæ, āā . f℥j.

Ft. sol.—Dose, a teaspoonful three or four times a day, according to age.

, however, the stomach rejects it in all of these forms, as we have
wn it to do, we have found the administration by enema of two
ns of quinia in a tablespoonful of starch-water, three times a day,
lly successful.

ordinary acute cases no other treatment is really required. It
be well to give a few doses of some saline febrifuge during each
until the fever is entirely subdued, and of course any special dis-
ance of function must be relieved by appropriate remedies. The
tment of pulmonary complications must be subordinate to that of
general disease. All depleting or perturbing treatment must be
ded, and it will generally be found that with the aid of mild coun-
rritation, the local symptoms will begin to improve, after the
arial fever has been subdued by quinia. It is necessary to keep up
action of quinia for some time after the paroxysms are broken, be-
se the tendency of the disease to recur is fully as great in children
n adults. We are in the habit of thus continuing it for three or
weeks in diminished doses, giving, however, on each septennary
od, dating from the arrest of the paroxysms, the full antiperiodic
e, suited to the age of the patient. At the same time the child
ld take suitable doses of iron and arsenic, which may be conveni-
y given in the following form:

℞.—Liq. Potassæ Arsenitis, ... fʒj.
Vini Ferri Amari, ... f℥iij.—M.

Dose.—From a half to a whole teaspoonful thrice daily in water after meals.

n chronic malaria we must persist in the use of quinia, iron, and
nic, for a considerable period. At the same time careful attention
t be paid to securing the best possible hygienic influences for the
d. When practicable, a change of climate should be secured by a
ney to the mountains or to the sea-shore. The patient should be
mly dressed, and carefully guarded against all exposure to damp or
. The diet should be carefully selected, and every error of diges-
promptly corrected. Even after the child is apparently restored

09–28 inclusive, only 99 deaths occurred from this cause; while in the ngle years 1856 and 1861, 992 and 1190 deaths respectively are re-orted. During the entire series of sixty years, there have been 13,016 eaths from scarlatina returned.

Hillier states, that during the eighteen years from 1848 to 1866, the eaths from scarlatina in London amounted to 52,461.

It is impossible to estimate the actual relative frequency of scarla-ina and measles, owing to the absence of any returns of non-fatal cases. t is evident, however, from the above table that, although the mor-ality from measles is also very variable, and thus may for a short time xceed that from scarlatina, in a long series of years the latter disease s far the more fatal. Thus the number of deaths from measles in this ity, during the past sixty years, amounts to but 2279.

MM. Guersant and Blache (*Dict. de Méd.*, t. 28, p. 173) state that it is ess frequent than measles or variola. They added together the cases f the eruptive fevers collected in 1838 and 1839, by MM. Roger, Rilliet nd Barthez, and Barrier, in the Children's Hospital at Paris, and found hat there had only been 157 of scarlet fever; whilst there were 267 of easles, and 213 of variola and varioloid.

The *forms* of the disease generally enumerated are the *simple*, *angi-ose*, and *malignant*. Authors differ widely in their descriptions of these hree forms. Many of the English authors include in the simple form nly the cases in which there is no affection of the fauces, while the angi-ose form includes all in which there is any throat affection whatever. M. Rayer, on the contrary, describes under the head of the simple form he cases in which the throat affection is mild, while he considers the nginose form to be that in which a pseudo-membranous angina occurs. gain, the descriptions of the malignant form are vague and uncertain, ome including under this term only the rapidly fatal cases in which erebral symptoms are present, while others include those also which re rendered malignant by the occurrence of pseudo-membranous an-ina.

We believe this division of scarlet fever into distinct forms and varie-ies to be, for several reasons, a faulty arrangement. It is not, it ap-ears to us, in the first place, consonant with the nature of the disease. carlet fever is, in fact, with all its degrees of severity, and apparent ifferences, a single and distinct fever, produced by one cause, deter-ining similar effects, howsoever much they may vary in degree, and quiring no more than does typhoid fever to be divided into the variety different forms, which it has been customary to ascribe to it. Again, e above mode of division is not, we are sure, a good one for practical rposes. It is impossible, indeed, as we have often found it, to refer any cases we meet with in practice, clearly and satisfactorily to any ne of the forms of the disease described in books. The simple form of ome of the English writers, or that in which there is no anginose af-ection, has no existence whatever, so far as we have been able to dis-over. We believe that inflammation of the mucous membrane of the auces constitutes an essential element of the disease, for we have never yet seen a case of scarlatina in which it was not present greater or less extent. It is often very slight, so slight, indeed, be unaccompanied by any evidence of pain in the part, but in all we have examined, it has been decided and obvious. This supp form of the disease does not, therefore, in our opinion, exist.

The two other forms usually described, the anginose and malign are also of little value practically, since we have found that in all se or grave cases, in which the patient did not die with violent ner symptoms under the first shock of the scarlatinous poison, there been developed a severe and dangerous anginose inflammation al the third or fourth day; so that it is fair to say that we cannot agine any malignant case, lasting over the third or fourth day, wh is not anginose, nor any severe anginose case, which might not als styled, from its dangerous character, malignant. We have foun impossible, in our experience, to draw the distinction clearly and dubitably between the anginose and malignant varieties, because severe cases partake more or less of the features of both.

Feeling this difficulty of describing the disease according to the m that had before that time been generally followed, and believing it to be insufficient for practical purposes, we were led to attempt, in first edition of this work, a different arrangement.

We made, accordingly, two forms or degrees of the disease, whic designated by the terms *regular* and *grave*. In the first form or de we included all the cases in which the angina was simple and the tion regular in all respects; in which there was no predominanc one set of symptoms over another, but in which all held a due rela to each other. In this form was embraced all the cases of scarla simplex of writers, and many of those of scarlatina anginosa of English authors. In the second form we included the cases which parted from the regular course of the disease, and which were rende dangerous by the occurrence of severe symptoms not belonging in same degree to the simple affection. This form we subdivided two varieties, the *grave anginose*, which contained all the cases acc panied by pseudo-membranous, ulcerative, or gangrenous angina; the *grave cerebral*, which comprised all those marked by the early currence of dangerous cerebral symptoms. The grave form com hended, therefore, some of the cases of scarlatina anginosa, and those of scarlatina maligna of writers, dividing, however, those in wh a pseudo-membranous, ulcerative, or gangrenous angina determined type of the attack, from those in which the cerebral or nervous sy toms gave to the case its stamp.

More extended observation and more patient reflection have ta us that this division also is incorrect,—that it does not afford a classification for the purposes of descriptiou, and that it is defectiv a guide in practice.

We adopted, therefore, in the third edition, and shall follow in present one, a different method of considering the disease, one w we believe to be more consistent with its nature, more suitable fo ses of description, and much more likely to prove useful in prac- We shall follow the same arrangement in regard to scarlet fever at now generally employed for typhoid fever. We shall consider a single and distinct disease, and not as made up of a number of tain and imperfectly separated forms or varieties, since these so nto each other, as to make it absolutely impossible to draw the learly and palpably between them. The only division we shall will be into *mild* and *grave* cases, since the only real difference een the cases is a difference in the degree of severity they ex-

USES.—It has been abundantly proved by long and reiterated ob- ation that scarlatina is propagated by two causes, *contagion*, and *mic* influence. Of these two modes of propagation, we have not east doubt ourselves that the latter is by far the most active. only necessary to look over the results afforded by the tables of ality for this city, as quoted in the early part of this article, and serve that in some years the disease caused a heavy mortality, hers a very small one, and that in others again not a single death it is reported, to be convinced that it is of a highly *epidemic* re.

e *contagious* character of scarlatina has been doubted by some few ons, but seems to us clearly proved by the evidence adduced by us writers. Our own experience also convinces us that it is a con- us disease, though much less so, we are sure, than either small- measles, hooping-cough, or chicken-pox. We have quite fre- tly, indeed, known children exposed directly and for a considerable th of time to the infection to escape entirely, while it is extremely for us to meet with children, unprotected by previous attacks, who resist the contagion of measles, hooping-cough, or varicella. But, gh we believe it to be much less highly contagious than has been rally supposed, and than the other contagious diseases just named, re also well convinced, as was stated above, that it is propagated considerable extent by a direct contagion. We have, in a number stances, known one child in a family to contract the disease from t exposure to it, or from the epidemic constitution of the atmos- e, and a second, third, and even a fourth, to take the disease from first, in five, seven, or nine days after the latter had fallen sick. In r instances, on the contrary, it would seem that either several chil- in one family contract the disease nearly simultaneously from the emic influence, or else that the period of incubation is sometimes short. For example, during the winter season, a child five months who had never been out of the house, was seized with it. On the nd day after the eruption appeared on this child, her sister, between and five years old, fell sick, and on the third day another sister, nly remaining child, between two and three years of age. In the of these cases it must have been contracted through the epidemic ence which was at that time prevalent in the city, since the child n no way been directly exposed to it. In the other two, we must either suppose the cause to have been the same, or else th period of incubation was only two and three days in the respective

The period of incubation is shorter than in other contagious er diseases. It may be stated to vary between twenty-four hours a or three weeks. MM. Guersant and Blache are of opinion that majority of cases, it is from three to seven days. MM. Rilliet an thez found that of 38 cases in which the time was recorded, it w tween 2 and 7 days in 16, between 8 and 13 in 15, and 15 and 4 cases. Our own observation would fix it at from 9 to 15 days majority of cases.

Occasionally, however, it is very short; thus Trousseau ment case in which the evidence is almost conclusive that the period o bation was less than twenty-four hours. Murchison also state this latent period varies from a few minutes to five days, rarely, i exceeding six days.

It is impossible to state with any certainty the length of time which the power of imparting the contagion continues in the p M. Cazenave (*Abrégé Prat. des Mal. de la Peau*, p. 54), states lasts throughout the period of desquamation, and that it would seem to be most active at that time.

Whatever may be the duration of this period, it is certain th virus may attach itself to clothing, bedding, or furniture, and th disease may thus be transmitted by one who is not himself att We also learn from some remarkable instances, as for example, case related by Richardson in "*The Asclepiad*," that when the v thus attached to fomites, it may retain its activity for many mo

In regard to the essential nature of the poison, it appears pr in the first place, that it is contained in the secretions of the sk fauces.

The distance to which it may be carried by the air does not to exceed a few feet, and in those cases where prompt isolatio not prevent the communication of the disease, the virus has been previously imbibed or is carried by fomites. It is proba material nature, and is admitted to the system either throu skin, the respiratory, or, perhaps, the gastric mucous membrane

As we have seen, it retains its activity for a long time; but dered inert by a temperature somewhat below 212° F.

Scarlatina is stated to be also inoculable, by the blood, the sec from the fauces, and the fluid from the miliary vesicles which oc ally form on the skin. The resulting disease appears in some ins to have been favorably modified, but the operation has been co tively rarely practised.

The epidemics of scarlet fever vary exceedingly in their exte violence. During the years 1842 and 1843, the disease prevaile extensively in this city, and assumed a malignant type, so tha considerable number of families, two, three, and even four childre within a very short period.

During the winter of 1856–7, and throughout the spring of 18 one of the most prevalent epidemics that ever visited this city, and he proportion of deaths to the whole number of cases in our own tice and that of our friends, was such as to seem to show that the of the epidemic was mild.

e disease prevails at all seasons, but is most frequent in the spring summer, and next in the autumn. It rarely occurs more than once e same individual, but that it does so sometimes, is proved by facts ght forward by different authors. It has been asserted that second ks of scarlet fever occur in the same person not more than once in ousand cases. Of the truth of this assertion we are, however, very tful, since it has occurred to us to see no less than three examples cond attacks in our own experience. We attended in this city one with perfectly well-marked scarlet fever, attested by subsequent arca, who had had the disease two years previously under the care e late Prof. C. D. Meigs. In the winter of 1852, we attended two ren in one family with the disease, one of whom died, and both of m had had the disease four years and a half before. They were ded in the first attack by one of ourselves, and as it chanced, g to our absence from town during one day, they were seen also ne of our friends, who made no exception whatever to the diag- of scarlet fever. The only doubt as to these cases having been able examples of double attacks of the disease, must rest of course the diagnosis. In the first example, the diagnosis was made by Meigs in the first attack, and by one of ourselves in the second. e two latter it was made by one of ourselves in both, accidentally rmed in the first attack, in both children, by the opinion of a com- nt professional friend. The first attacks in the latter cases were mild, but well marked; the second were both severe, and one ed fatal on the sixth day. We have not the least doubt ourselves all of the three were cases of true scarlet fever. If they were not, two latter must have been cases of roseola, so closely resembling atina as to oblige us to confess ourselves incompetent to distinguish een the two diseases. What adds to the certainty that the two h came under our own observation were examples of scarlet fever, e fact that they occurred simultaneously with a third case in the e family. Now, roseola is not apt, so far as we know, to occur epi- ically in a household. Most of the cases of that disease that we have , have been solitary ones. Again, in the spring of 1857, one of us a well-marked attack of the disease in a boy nearly four years old, had had it one year before, under the charge of a perfectly com- nt practitioner.

r. Richardson (*loc. cit.*) asserts that he has known the disease to r twice in the same patient, and also states that he himself has red from it three times.

ge.—MM. Rilliet and Barthez state that it is most common from six en years of age. Of 251 cases that we have seen, in which the age noted, 64 occurred under 3 years of age, 78 between 3 and 5 years, etween 5 and 7, 47 between 7 and 10, and 11 between 10 and 15.

From this it would appear to be more common in the first five y than between the ages of five and ten, since of the 251 cases, 142 curred in the former, and only 98 in the latter period. By uniting statistical tables of Dr. Emerson with those of Dr. Condie (*Dis. of Ch* 2d ed., note, p. 86), we obtain the deaths from scarlatina in this city different ages for a period of thirty years. These tables show clea that the disease is most common between the ages of one and years. The total mortality from scarlatina under ten years, dur the time stated, was 2171, of which 132 were under one year of 411 between 1 and 2, 1130 between 2 and 5, and 510 between 5 and

Of 148,829 cases collected by Dr. Murchison from the death return Great Britain, 9999, or about 7 per cent., were under 1 year; 30,974 20 per cent., under 2 years; 95,070, or 64 per cent., under 5 years; 38, or 26 per cent., between 5 and 10; and but 13,168, or about 9 per ce at all ages above 10.

This agrees quite closely with the averages calculated from the tensive statistics collected by Dr. Richardson, which show the foll ing percentage at different ages:

Under 5 years,	67.63
From 5 to 10,	24.33
" 10 to 20,	5.52
" 20 to 40,	1.73
" 40 upwards,	0.66

Out of 12,962 deaths under 5 years, 1289, or 9.9 per cent., were un 1 year; 2874, or 22 per cent., between 1 and 2; so that 4163, or 31.4 cent., were under 2 years.

The earliest age at which we have seen it perfectly well marked, twenty-one days. We saw it once also in a child five months of and twice at the age of six months. It is not nearly so common in first year of life as it is afterwards. The largest number of cases oc according to our experience, in the third, fourth, and fifth years of

The influence of *sex* seems not to have been determined with certain Dr. Tweedie (*Cyclop. of Pract. Med.*, art. Scarlatina), says it is m common in girls. MM. Rilliet and Barthez, on the contrary, state be more common in boys. Of 262 cases under 15 years of age that have seen, in which the sex was noted, 133 occurred in males, and in females. The truth is, probably, that under puberty it attacks two sexes with about equal frequency, while after that age it is m common in females.

It occasionally happens, that patients, both adults and children, have undergone surgical operations, are attacked with a scarlatin rash, with mild constitutional symptoms (Hillier, Gee). The disea according to these authorities, is true scarlatina; and its occurren that time probably depends upon the system being in an unusua favorable condition for the reception of the virus.

SYMPTOMS; COURSE; DURATION.—As has already been stated, we tend, in our description of the symptoms of scarlet fever, to depart fr ordinary mode of arrangement of the subject. We shall discard old division of the disease into three forms or degrees, scarlatina plex, anginosa, and maligna, and substitute, for reasons already n, the simple division into mild and grave cases. We shall class as l cases those which pursue an even and regular course, without g accompanied by dangerous or malignant symptoms, in which e occur neither violent nervous, nor threatening anginose symptoms; le among the grave cases we shall place those in which there occur re nervous symptoms, in the form of violent delirium, coma, or con- ions, dangerous symptoms in the form of diphtheritic, ulcerative, angrenous inflammation of the mucous membrane of the fauces, and lly, those in which the general symptoms assume a low and typhoid acter. When it seems convenient, we shall follow the usual divi- of the course of the disease into the three stages of invasion, erup- , and desquamation.

ild Cases.—Stage of Invasion.—The following description of the ptoms of scarlet fever in its mild form is drawn partly from books, much more from our own observation of 213 mild cases of the dis- , of all of which we have kept a faithful record, and, when there was thing peculiar or important, full notes.

he onset of mild cases of scarlet fever is generally sudden. A child ell, or so slightly ailing on one day, as that the change from its l condition is not noticed at the time, though it may be recollected wards, and on the following day, or often within twelve hours or less, the symptoms of the disease become marked and character- . In a large majority of the cases that we have seen, the eruption already visible at our first visit. Frequently the patient has been to bed well in the evening, and, becoming restless and feverish in night, is found on the following morning with fever, sore throat, very considerable eruption; or, as happened in one of our cases, a l gets up in the morning apparently well, breakfasts as usual, goes hurch, and falling sick while there, comes home and, a few hours r, shows the eruption over the neck and upper part of the trunk, has fever and sore throat. In another case, a boy between seven eight years old was perfectly well in the morning. At 2 P.M., his her, a most sensible and accurate person, observed him playing in garden, and remarked upon his healthy looks. Fifteen minutes r this he felt sick at his stomach; he came into the house and went o the nursery, looking pale and pinched, with a cold skin, and nearly ted in the nurse's arms. He had then in the course of an hour e copious and watery stools, each one accompanied with vomiting. saw him one hour after this, dozing, very pale, with pinched ures, sunken and half-closed eyes, cool surface, and with the pulse 28, and rather feeble. There was no eruption. At 6 P.M. we found with a hot and dry skin, with the tongue heavily coated, the fauces llen and showing flecks of exudation upon the tonsils, a pulse at 128, with a well-marked scarlatinous eruption coming out abundantly.

The case pursued a very regular course, without dangerous or m symptoms of any kind.

But the invasion, though sudden in nearly all cases, is not al precipitate as we have just described. When we come to anal early symptoms, we find that the first one observed in most of t is fever, marked by considerable acceleration of the pulse and skin. In some few cases the fever is preceded by the ordina dromes of febrile diseases, languor, lassitude, pains in the back an and slight rigors. Simultaneously with the fever there is in ne cases more or less soreness of the throat. In all that we have exa even those in which no pain was complained of, there has been r or redness with swelling of the fauces. In a majority of the vomiting occurs, or if not vomiting, some degree of nausea. T complete anorexia; the thirst is acute; the bowels are usually i natural condition, or slightly constipated. The child is quiet an or else restless and irritable, and sometimes there is delirium; t is generally flushed, and the eyes often slightly injected. The d of these symptoms is irregular. They are said to last generally a day, but they may continue either a shorter or longer period are very sure, from our own observation, as we have already that these preparatory symptoms rarely precede the eruptio than twelve hours, and very often the time is even less, so t eruption may even be the first symptom noticed.

Stage of Eruption.—The eruption generally appears first on t and neck, whence it extends rapidly over the whole surface. tinues to increase in extent and intensity, so as to reach its ma about the third or fourth day. It appears first in minute d points dotted upon a rose-colored surface, forming patches of ir shape, of considerable size, level with the skin, disappearing pressure, divided at first by portions of healthy skin, but runni idly together, and giving to large portions of the surface a u scarlet color. The eruption is not generally equally diffused o whole body, but is more marked upon one portion than anoth is often most intense on the back, and is there of a deeper col elsewhere, not unfrequently assuming a purple hue. It is ge very well marked on the abdomen and thighs, and about the a tions, and assumes in those regions a particularly bright tint.

It does not always cover the whole surface, but in some ver cases, and, as we shall find when treating of the grave cases, i latter, also, it may occur only in patches of moderate extent up ferent portions of the body, leaving us at times in some doubt as real nature of the rash.

The surface of the eruption is smooth and even to the touch, as not unfrequently happens, it is accompanied by the developm miliary vesicles, or crops of minute pimples or pustules. A degree of roughness is sometimes occasioned also by enlargem the papillæ of the skin in various parts of the body, particularly extensor surface of the limbs; but these are evidently indepen e characteristic eruption. The skin upon some parts of the body, pecially the face, hands, and feet, often presents a swollen appear- nce, rendering the movements somewhat stiff. There is in most cases feeling of burning, irritation, and itching in the skin, the latter of hich symptoms increases as the malady progresses.

If the nail be drawn firmly over the skin where the eruption exists, white line is produced, which lasts for a short time and then passes way; if the pressure be more firm, a central red line with a white reak on either side is developed. This was originally pointed out by ouchut as pathognomonic of scarlatina, the peculiarity, according to m, consisting in the great duration of the white line so caused. It es not appear, however, to have any positive value in distinguishing s affection from many forms of erythema.

The eruption generally reaches its height about the fourth day, and n remains stationary for one, or less frequently two days, after ich it begins to decline. Its decline is marked by a diminution in intensity of the color, which, from scarlet, becomes red, then rose- ored, and growing paler and paler, finally disappears entirely about sixth, seventh, or eighth day. In some very mild cases, however, whole duration of the eruption is not over two or three days, and such the color it imparts to the skin is never very bright nor very p, nor is it accompanied by intense heat, or by much irritation or ing.

The symptoms which preceded the eruption do not subside on its earance, but persist or are augmented. The febrile movement con- ues unabated; the pulse is full, strong, and frequent, running up very n after the onset to 120, 140, 150, and often to 160. This frequency the pulse is, in fact, one of the most marked symptoms of the dis- e. We have rarely, even in very mild cases, found it less than 140, l in not a few it has been in the first few days, and in children of r or six years old even, as high as 168 or 170. Occasionally, how- r, it has been lower, and in a case that occurred to one of us, in a five years old, it was 96 on the second day, and only 88 on the rd, though there was still a good deal of rash upon the skin. The n is burning hot and dry, as a general rule, and loses its usual soft- s and suppleness. The expression of the face is usually natural. e eye is often animated, and slightly injected. The respiration is erally easy and natural, though sometimes, when the fever is vio- t, it becomes quickened. The auscultation and percussion signs are tural, unless some complication exists. There is often a rather fre- ent cough, which is dry, and evidently depends on the guttural in- mmation, and not on any bronchial or pulmonary affection; it exists ring the early period of the eruption, and declines with the inflam- tion of the fauces. The voice is seldom altered beyond having a sal sound, so long as the disease continues simple and regular. If voice becomes hoarse or whispering, it indicates an extension of inflammation from the pharynx to the larynx. The anorexia con- ues until the eruption begins to decline, and the thirst is acute up o signs of prostration, and the decubitus is indifferent. There is st always more or less disorder of the nervous system, sometimes nting only to headache and restlessness, while in other instances is great irritability, wakefulness, and occasional delirium, especi- at night.

age of Decline and Desquamation.—The eruption reaches its height, ready stated, about the third or fourth day, then remains station- for one or two days, and afterwards declines gradually, so that no es are left on the sixth, usually, or at most, in rare cases, on the h or tenth day. In some very mild attacks, the whole duration of eruption is not over two or three days. By the third day it has ppeared entirely. Such cases are not, however, very common.

other symptoms, both general and local, decline with the erup- the pulse loses its frequency, and falls to the natural standard; eat of the surface first subsides and then disappears, but the skin ains somewhat harsh; the redness and swelling of the tonsils and ynx diminish; the spots of false membrane, if these be present, hrown off; the deglutition becomes easy if it have been difficult, soon all signs of throat-affection vanish; the tongue cleans off, be- es reddish and glossy, and after a time returns to its natural state. the time that the subsidence of all the symptoms takes place, *uamation* begins. It dates, therefore, in most cases from about the day, though it may be either earlier or later. According to Hil- the date of commencement varies from the sixth to the twenty- day. It commences in most of the cases on the face and neck, gh in a few instances it appears first on the abdomen. It then ex- s gradually over the body and becomes general. About the thorax abdomen it occurs in the form of minute points, like those which t from the desiccation of sudamina; on the face it is in the form of light scales or squamæ, while on the extremities large flakes of epidermis become separated from the derm, and are removed he child, or rubbed off by his movements in bed. The whole pro- usually occupies some ten or twelve days, but may be prolonged the third week, or even until the middle of the second month. It nerally accompanied by roughness and dryness, and some itching irritation of the skin. Not unfrequently, the surface beneath the liation is left tender and irritable for some time afterwards.

uring this period, dating from the sixth or eighth day, the urine mes abundant, pale, of neutral or faintly acid reaction, and, accord- to Gee, deficient in phosphoric acid.

lbuminuria is also frequently observed during desquamation, very h more so than during the eruptive stage. It is usually transient, may continue until dropsy occurs. Sometimes the albumen totally ppears, and reappears when dropsy comes on a fortnight or three ks later. The proportion of cases in which this form of albumin- is present varies in different epidemics, from twenty-five or thirty inety per cent.

emperature.—The fiery redness of the surface and the pungent char-

acter of the heat, have led to much exaggeration in the desc
the pyrexia in this disease. The range of temperature is ind
100° to 105°, and only in rare cases does it reach 106°.

In 30 cases reported by Ringer (*Med. Times and Gaz.*, F
1862), the temperature remained at the same point throughou
in the more severe attacks; in slighter ones, it fell in the mor
rose during the day, being most frequently at its highest point
2 and 8 P.M. When the morning remission was marked, it i
the approach of a favorable termination. The first decide
temperature, coinciding with a diminution in the eruption, oc
the majority of cases on the fifth day, or if not on this day, i
was deferred until the tenth or fifteenth. In these latter ca
ever, a fall of varying extent had occurred on the preceding fi
After the marked fall on the fifth, tenth, or fifteenth day, the
ture remains from 99° to 101° for a variable time, coinciding w
sistent, with continuance of the angina, or some one of the othe
of the disease. If at any time after the complete fall of the
ture, there is any considerable elevation again, it indicates the
ment of some sequel, either an affection of the kidneys, throa
of the serous membranes. It is thus seen that the temperatur
latina tends to form arcs or cycles, usually of five days' durati

Before quitting this part of our subject, we must remark that
the above is a correct description of the usual symptoms of m
of this disease, the reader would be greatly deceived should h
always, and invariably, to find this exact train of morbid phe
On the contrary, the mild and the grave cases both vary so m
it is impossible to describe them accurately by one or two p
Taking the above sketch as a standard of the mild cases, the
will find that many fall short of it in all their features, whil
deepen gradually in their shades, so to speak, until they pass
grave type. Those that are milder in their type than the above
may be so in such a degree as to make it very difficult, and
cases impossible, to determine positively whether the child has
disease or not. Indeed, we doubt not ourselves that childre
times have the disease so slightly, that it is not discovered b
the physician or parents, and, being protected by the attack
after-life classed amongst those insusceptible to the diseas
grounds for asserting this are the facts that some cases we ha
have been so very mild that, but for the existence of the
amongst other members of the family, they might have passe
served; and that in one instance we were sent for to see a patie
had had the eruption for three days, and yet who was so sligh
that he was sent for from school, to which he had gone, for m
It was a well-marked case, and the child had no troublesome
toms afterwards, notwithstanding the exposure he had underg

A still more remarkable case occurred to one of us two yea
which shows clearly how a child may take scarlet fever wit
being recognized by the family.

CASE.—The mother of one of the families we attend consulted us about one of her ns, a sturdy boy of seventeen years of age. She stated that he had not been well r two days; that he had a severe sore throat, was restless and feverish at night, ould eat nothing, and complained of debility, but, as he was then going through his xamination at the High School of this city, he refused obstinately to remain at ome. It was agreed that he should call at our office the next morning, on his way o the school. When he arrived, which he did on foot, as usual, we found him covred with a copious, dark-red, perfectly characteristic scarlatinous eruption; his hroat was very red, swollen, and quite painful; the pulse was over 120, active and ill, and the skin hot. He was, of course, ordered home, there to remain until perectly well. He recovered and had no drawback. The distance from this boy's home o his school was not less than a mile and a half, and he had walked this distance wice a day.

Grave cases.—The following description of the symptoms of grave ases of scarlet fever is, like that which has just been given of the mild ases, drawn partly from books, and partly from our own observation f the disease. Our own experience includes the careful observation, nd a more or less full notation, of 61 grave cases. We shall include nder this division of the subject, as already stated, most of the cases sually classed by writers under the title of scarlatina anginosa, and ll those generally described under the title of scarlatina maligna.

The symptoms which mark the *invasion* of grave cases of scarlet ver, though sufficiently alike in all to show the unity of the disease, iffer very materially as to their degree of severity in different cases. n one set (rather less than a third, or 18 in 61, of our cases), they are ost violent and dangerous, or, indeed, appalling in their character. rom the first, they declare the imminent danger of the attack. In he second set (rather more than two-thirds, or 43 in 61, of our cases), hey may be either evidently severe and dangerous, though not appallg, as in the first, or they may be much milder, more like those which ark the invasion of mild cases, but even under these circumstances ey soon put on their grave and dangerous character.

The first set of cases, or those in which the symptoms are the most vere of all, and which include most of the malignant cases ordirily styled ataxic, usually begin with nervous symptoms. The set is in some instantaneous. In one, the little patient, a girl two ars old, whose brother and sister had been sick for some days with rlatina, was put to bed in the evening in her usual health, which s strong and vigorous. She slept quietly through the night, but s found by the mother the next morning in a state of drowsiness, lent fever, and covered with a deep-red scarlatinous rash. She soon came comatose, and died on the third day. In another case, a boy ven months old was a little fretful in the afternoon, but was put to d in the evening as usual and went to sleep. About ten o'clock the rse heard a rustling in the bed, and on going to it, found him in a lent general convulsion. The next morning he was covered with a rlet rash, which became deeper and deeper as the disease went on. n the second day he was nearly insensible, and had frequent attacks convulsions; on the third day he had retraction of the neck, with gun to swell. On the fifth day, the swelling had become very great; e stupor had returned; a profuse and disgusting coryza and otorrhœa d set in; and the edges of the eyelids were inflamed and sore. On e sixth day the discharges from the mucous membranes of the head ere very copious, and consisted of a thick, offensive, purulent fluid termixed with dull whitish grumous particles. The patient was now matose or very restless; she swallowed with great difficulty; the elling under the lower jaw and about the throat was enormous; the lse was rapid and small; the eruption was very dark in tint; the cuneous circulation was slow; the extremities were cold, and death curred about the middle of this day. In another case, the subject of hich was a girl between three and four years old, the attack began ith severe inflammation of the throat, causing great difficulty in wallowing. The rash on the first day was very extensive and of a ep-red color. The child was drowsy and heavy, or else delirious. n the second day she was comatose, and had strabismus and autoatic movements of the limbs. On the third day the coma continued, d there were automatic movements of the extensor muscles, with reaction of the head. The eruption continued vivid, but was of a darkd color. Death occurred in the middle of the fourth day, in a state coma, without convulsions. In still another case, a boy, between ght and nine years old, was attacked suddenly, while in good health, ith vomiting, sore throat, and high fever. Twelve hours after the set, he had a severe convulsion, which lasted fifteen minutes. He on recovered from this, however, and remained perfectly intelligent. n the second day the rash was moderate; there was violent fever, nd the child was heavy, but, when roused, still intelligent. Early in is day a severe fit occurred. This was most violent, as severe as the orst epileptic convulsion. It lasted one hour and three-quarters. he pulse, after this, was 145. On the third and fourth days, the ymptoms improved very much, the pulse having fallen to 125 and 132, ut he continued drowsy and heavy. The eruption came out most bundantly. The fauces were very much inflamed and somewhat ulcerted, and the external lymphatic glands were enlarged, but still the wallowing was not difficult. On the fifth day he was not so well, eing more restless and heavy alternately. There had now come on uch difficulty in breathing, and some croupal sound. The latter symptom increased through the day, until the dyspnœa became very great. eglutition now became excessively difficult; the external swelling increased; attacks of suffocation attended with the most painful and distressing jactitation came on, and were renewed more and more frequently; and death occurred by asphyxia about the middle of the sixth ay. In a tenth case, in a girl five months old, convulsions occurred on he second day. These were followed by coma lasting several days, and y enormous swelling of the lymphatic glands and subcutaneous tissues n the left side of the neck, and by a less degree of swelling on the right ide of the neck. The glands of both sides suppurated and were opened, nd the child finally recovered perfectly. In an eleventh case, in a boy seven years old, an attack of general convulsions took plac third day, after which there were delirium and coma altern several days, with coryza, angina, and offensive otorrhœa, lasti six weeks. The child recovered, but remained deaf.

In this form of the disease, therefore, the symptoms are of virulent character. The onset is sudden. The child passes with hours from a state of apparent health, into one of the extrem ger. Most of the cases begin with violent fever, and great de of the strength. The pulse soon becomes very rapid (140, 150, so frequent that it cannot be counted, and it is at the same tin and often irregular. The skin is dry and burning hot in some others cool or even cold. There is generally nausea or vomiti these may be violent and constant. These are accompanied cases, but in our experience, only in the severest of all, by tive diarrhœa and meteorism. Delirium often exists from the else there is drowsiness and dulness of intelligence, verging g into coma. In the most violent cases, the stupor or coma a with convulsions, which may cause a fatal termination in e twenty-four, or thirty-six hours.

When a case of this kind lasts over three, or even two days, lence of the nervous symptoms almost always subsides; the con cease to recur; the delirium is less violent; the coma gives drowsiness, or the patient becomes again quite intelligent and ant; the pulse often falls in frequency, and the heat of sk diminish, and the eruption assume a more favorable appearan the symptoms seem, indeed, to be more promising, and very oft the physician and friends are greatly elated by the improvemen patient's condition. Nor are these hopes always illusory, since do recover occasionally even in cases that have exhibited th threatening and malignant appearance at the moment of invas happens, unfortunately, however, in a majority of such attac the improvement which takes place on the third or fourth day momentary. The nervous symptoms subside, but new phenomen their appearance in the shape of severe inflammation, mem deposit, and perhaps ulceration of the fauces, and extensive and induration of the lymphatic glands and subcutaneous tissu the angles of the inferior jaw, and under the chin and throat. nection with the throat-affection which develops itself in this w very common to have abundant purulent or membranous cor often also otorrhœa. The symptoms assume, in fact, the featur cases usually described under the title of scarlatina anginosa. shall, however, describe them directly in our account of the se of grave cases, it is unnecessary to pursue the description at the moment. We will state, however, before proceeding further, anginose and general symptoms which occur in cases beginni violent nervous phenomena, and especially with convulsions, ar always of the most dangerous and malignant character, and usu fatally in two, three, or four days after their appearance.

The eruption in this class of cases varies according to the violence of attack. In the severest one that we saw, that which proved fatal fifteen hours, no eruption whatever was perceived, and we only knew to be scarlatina by the character of the other symptoms, and by the t that the sister of the boy had been sick in the same house with the ease for a week. In the case which terminated in twenty-four hours, e eruption showed itself in the form of scarlet patches about the face d upper parts of the body, twelve hours after the onset. In a third se the eruption was moderate, but perfectly well marked and general. the other thirteen cases, which lasted, with one exception, not less an three days, the eruption was perfectly well marked. It covered e whole surface, was at first scarlet in color, soon ran into a deep red, nd then became violet or purplish. The exceptional case was one hich lasted thirty-six hours, and proved fatal in that time. In this so, the eruption was well marked and extensive. M. Gueretin (*Arch. Méd.*, t. i, p. 292, 1842), in his account of the acute malignant form hich he witnessed, states that the eruption was nearly constant. In l our cases it occurred within twenty-four hours from the invasion, hile in those of M. Gueretin, it appeared within twenty-four or forty-ght hours, or, as more frequently happened, not until the fourth or fth day.

If no favorable change takes place in these severe cases, and when ey do not prove fatal at once, the patient grows weaker and weaker; e delirium continues, or is replaced by coma; subsultus tendinum, idity of the limbs, spasmodic twitchings or general convulsions, make ir appearance; the eruption becomes more and more livid; the pulse ows smaller, more frequent, and irregular; the respiration is excessely embarrassed; deglutition becomes impossible; and the patient s in from three to seven or nine days. In some few instances, the ld struggles on for several weeks, and dies in a state of utter exhausn, or, having a constitution of great powers of endurance, at last surunts the disease and recovers.

The invasion of grave cases is not always, as we have stated above, violent as in those which have just been described. In rather more an two-thirds (43) of the 61 grave cases that we have seen, the onset s less threatening than in the other third, though the symptoms re severe and dangerous in most of these also, and when not so at e very start, very soon assumed the serious characters which make necessary to class the cases in which they occurred as grave. The ief difference between the symptoms that mark the onset of grave ses of this kind, and of those in which the symptoms are still more lent, which latter we have thus far been describing, lies in the charter of the nervous phenomena—in the latter most severe, threatening, d dangerous, consisting of stupor, coma, or convulsions, and in the mer, merely excessive agitation, restlessness, heaviness, or stupor. one well-marked case of the kind now under consideration, the tient, a boy between seven and eight years old, was attacked in the ening with headache, fever, and vomiting. On the following mornber side of the neck. The pulse was 155, and small. In the middle the day the breathing became difficult, from the internal and exter- al swelling, and from the collection in the fauces of thick and viscid hlegm. The surface had now become pale. The tumefaction about he neck was immense. Down the front of the neck and along its sides o the clavicles, a kind of œdematous swelling of great size had come n, and was rapidly increasing. The pulse was 160, small and feeble. he legs and arms were of a dark, congested tint. Deglutition was cessively difficult. In the evening the pulse was 172, and death took ace just before midnight with slight convulsive movements.

The mode of invasion is different, therefore, in different examples of kind of grave cases now under consideration. In some it is even der than in any of those that have just been detailed; and it is not il the third, fourth, or fifth day, or even later, that the severity of attack shows itself fully and unmistakably.

fter the disease is once established, it will be found upon examina- , that the fauces are of a deeper red color, and that they are more lled, than in mild cases. At the same time there is more difficulty pain in deglutition; these are complained of by older children, and shown in those who are younger by their refusal to swallow, by ir crying upon making the attempt, and in some instances, especi- at a later period of the sickness, by a positive inability to perform movement. In nearly all of these cases, false membrane is formed n the mucous membrane of the throat. This is never, or very ely, present on the first day of the attack. In most cases it is not nd until the second or third, and often not before the fifth or sixth . MM. Rilliet and Barthez state that they have known it not to ear until the tenth and eleventh days. It appears first in small, n, whitish, yellowish, or ash-colored points or patches, on one or h tonsils, or on the soft palate only, where it remains limited, or m whence it extends to the pharynx, which it may cover in whole n part. The patches are of variable thickness and consistence, and ere sometimes very slightly, and sometimes with considerable tenac- to the mucous membrane beneath. They may remain for a day, l then be thrown off not to be again produced; or they may form in eral successive crops, until the case is terminated; or, as most fre- ntly happens, they last three or four days or more, and are then ached. The mucous membrane upon which they are seated is found various conditions. It may present the redness and swelling indica- e of severe inflammation, or it may be softened, ulcerated, and, ac- ding to MM. Guersant and Blache, gangrenous, though as a gen- l rule, what have been supposed to be sloughs are in fact portions altered false membrane. There is more or less fetor of the breath, netimes amounting to a gangrenous odor, after the appearance of pseudo-membrane. The severity of the symptoms is in proportion the extent and thickness of the false membrane.

We have already seen that it is not uncommon to find ulcerations neath the false membranes. In other cases of this kind the throat-

affection assumes very great violence without the presence of an
dation whatever. In some the mucous membrane is of a deep
even purplish hue, its consistence is softened, and it is swelled an
ered with a layer of grayish or sanious pus. The tonsils are en
infiltrated with pus, softened, and break down easily under the
In other cases, in addition to the redness and softening, ulceratio
present. These may be superficial, amounting only to erosions,
may extend through the mucous, and even submucous tissue
muscles beneath. They are seated generally in the pharynx, b
exist also on the tonsils, and in some rare cases they extend in
larynx. In still more malignant attacks of the disease, we fi
dences of gangrene of the pharynx. It is important to distingu
tween those in which the pseudo-membrane becomes so change
assume the appearance of sloughs, and those in which the tissues
pharynx are really gangrenous. The former constitute by
greater number of the cases which have been generally regarde
stances of gangrene of the throat. That gangrene of these
does actually occur in some few cases, is proved, however, by
dence of Dr. Tweedie, who says (*loc. cit.*, p. 650), that in ma
scarlatina "the membrane of the pharynx is sometimes of a dar
color, and occasionally in a sloughing state," and by that of MM
sant and Blache, who state that they met with several instances
grene of the pharynx in the pseudo-membranous angina whi
vailed in 1841.

An almost constant accompaniment of cases of this kind is
mation and swelling of the submaxillary lymphatic glands a
rounding cellular tissue. The tumefaction is generally confined
to the glands beneath the jaw, which become painful to the
After a short time it extends to the parts behind the angle of t
and beneath that bone, until at last the sides of the neck and the
are largely distended, so as to interfere with, or even prevent i
measure, the opening of the mouth, and by the pressure exerted
internal parts of the throat, to add to the difficulty of deglutition
already exists. In some cases the pressure is so considerable as
barrass the respiration of the child. This swelling has been ge
supposed to depend on inflammation of the parotid glands; b
Bretonneau, Guersant and Blache, and Rilliet and Barthez, a
at parotitis is of exceedingly rare occurrence, and that the
question depends nearly always on the causes just described
named writers state, moreover, that the tumefaction of the
ue is often of the nature of active œdema. The swelling
vical lymphatic glands, and of the cellular tissue of the sides
, and that under the throat and chin, seldom takes place
iderable extent, according to our experience, prior to the
h day. During the first two or three days, the chief sym
he fever, the eruption, and the nervous phenomena, which
n this class of cases, of either excessive agitation and
rowsiness or stupor. Very often, after a child has

e very ill for two, three, or four days, from the violence of the feb- reaction and the severity of the nervous symptoms, it will appear mprove very decidedly on the third or fourth day, and elevate tly the hopes of those interested in it. It is just at this time, how- , that the throat-affection is apt to set in severely; and, moreover, rely fails to come in children who have presented violent symp- s during the first three days. The enlargement generally disap- s, in favorable cases, in from three to twelve days, by resolution, le in others it terminates by suppuration of the glands and sur- ding parts.

the form of the disease we are now considering, it is common to rve violent *coryza*, which may be either purulent or pseudo-mem- ous. It may appear from the very first, or not for several days r the eruption has commenced. The discharge is yellowish, granu- thin at first, and afterwards thick; it contains often flakes and ds of exudation, and becomes sometimes very offensive, and highly d, so as to excoriate very much the upper lip. It often flows in sur- ing quantities, and generally continues up to the moment of death, ntil all the symptoms have moderated.

torrhœa is another symptom of this form. It generally occurs simul- eously with coryza. The discharge is at first thin and watery, like from the nostrils, but becomes gradually thicker as the case ad- ces. The quantity is extremely variable. In some cases we have wn it to fill the meatus and concha of each ear, and then to flow out make large stains upon the pillow, or to collect very rapidly after g wiped away. It is, like the coryza, an unfavorable symptom, as a mark of the grave form of the disease, and because, if the child overs, it is very apt to result in deafness, which is but too often per- nent.

hese symptoms, coryza and otorrhœa, sometimes exist also in mild es, but they do not then assume the peculiar characters which they sent in grave cases. The discharges are much less abundant, and mucus or pus is healthy, and scarcely offensive to the smell; they but a short time, and are very rarely accompanied at the time or owed by more than a slight degree of deafness.

he eruption is generally stated to appear later than in mild cases, l often to be less vivid and less extensive. It is also said to occupy y portions and not the whole of the body, to occur in irregular ches, or to appear and disappear alternately. This has not been case in the instances which we have seen. In all but two of the ty-one, the eruption occurred early, generally within twenty-four urs from the onset. It was of a deep brick-red or livid color, and cov- d the whole surface. In one of the exceptional cases it did not take ce until the seventh day, when it appeared in patches on the wrists d knees. On the eighth day, it extended to the rest of the extremi- s and abdomen, and on the ninth was general and of a rather dark e. In the second exceptional case the eruption did not appear until second day. It then came out over the whole trunk, and to a mod- ate extent upon the limbs *also*. In this, as in the previous one, it was dark in its tint. In three other cases it was quite moderate in amount, but general and well-marked.

The *general symptoms* are more severe in grave than in mild cases. It sometimes happens that for one or two days, or even longer, the case promises to be mild, but then suddenly assumes the threatening features of the form under consideration. The fever is usually intense, the pulse being full and strong, and rising very soon after the onset to 140, 150, or 170; the skin is very hot and dry; there is more restlessness and irritability than in the mild form, and after one, two, or three days, appears a strong disposition to delirium and stupor, not unfrequently merging into coma. The respiration is accelerated, and in many instances, owing to the throat-affection, labored and difficult. In most of the cases, a loud gurgling, which is very characteristic, is heard in the throat, particularly when the child is asleep or dozing. This depends in part upon the collection of viscid and tenacious secretions in the fauces,—which sometimes embarrass the respiration so much as to make it necessary to remove them with a mop,—and in part upon the existence of the coryza of which we have spoken. The coryza is a symptom of very serious consequence at all ages, but especially in young children. There is generally some cough, which may be frequent and troublesome, though not usually so unless there be a disposition to laryngeal complication. The voice is hoarse, guttural, and sometimes whispering. When the cough is very frequent, and still more, when it becomes hoarse and croupal, in connection with hoarse or whispering voice, or aphonia, there is great reason to fear the extension of the exudation into the larynx, which constitutes an almost necessarily fatal accident. The face is deeply flushed at first, and the expression anxious. If no improvement take place, the case assumes in four or five days, or even less, a still more threatening aspect. The pulse becomes very rapid and small; the restlessness and delirium pass into drowsiness or coma; the tongue becomes brown and dry; the teeth are covered with sordes; the lips are dry, cracked, and bleeding; diarrhœa is apt to occur; and the patient dies in from three to ten days, in a well-marked typhous condition. In other instances, on the contrary, the case runs on from week to week, and at last, after an illness of four, five, or six weeks, the child either dies or recovers after all chances for life seem to have been lost.

In order to show, in their natural connection, the different symptoms that have just been described, we will cite the following abstracts of three of our cases. The first occurred in a boy between seven and eight years old. On the fourth day of the attack the pulse was at 150, and the fauces presented flakes of false membrane. The fauces were very much swelled, and deglutition became difficult; faucial gurgling came on, and the throat was filled with viscid and tenacious secretions. The nasal passages now became occluded by constant discharges, at first mucous and then muco-purulent, with admixture of membranous particles. From the fifth to the ninth day there was an excessive fetor from the nose and mouth. The lymphatic ganglions just beneath the ear swelled very greatly, so as to extend much beyond the line of the inferior maxilla. The tongue and lips became dry and cracked, the teeth were covered with sordes, and the angles of the eyelids inflamed and then ulcerated. On the sixth, seventh, eighth, and ninth days, there were taken away from the mouth and throat of the child, with a mop, hard and most offensive masses of dried-up mucus and incrusted epithelium, enveloped in thick, gluey, dark-colored mucus. These masses stuck to the fauces, tongue, and lips, so tenaciously, that they could be removed only by means of a mop, the boy himself being quite unable to detach them. On the seventh, eighth, and ninth days, though the cervical lymphatic glands were very much swelled, the patient was better. The pulse came down gradually from 152 to 132, 128 and 112, and the swallowing improved so much that the child could take liquids with less convulsive effort, and could drink continuously. The drowsiness diminished, and the delirium ceased. On the ighth day a slight erythematous redness appeared on the bridge of he nose, and extended towards the malar bones. The skin of the face nd eyelids became somewhat swollen and puffed by an œdematous ffusion. On the ninth day the pulse was down to 104, and the skin was nearly natural as to temperature. The swelling was very great n both sides of the neck, and the glands on the right side were red on he surface, very hard, and quite painful. The swallowing was much asier for drinks, but as yet no solid, not even of the softest kind, could e taken. On the fourteenth day from the onset we opened a very arge abscess on the left side of the neck, which discharged abundantly healthy and laudable pus. On the fifteenth day we opened a still arger abscess on the right side, and, after this, perfect recovery took lace.

In another example, which has been alluded to already, occurring in boy between four and five years old, the gravity of the case did not how itself clearly until the sixth day. On the evening of that day he pulse was 128, the skin very hot and dry, and there was an intense ruption of a brick-red color. There was, at the same time, great rowsiness, and utter loss of appetite. Deglutition was difficult, and here was a loud faucial gurgling during sleep. There was now lso a considerable amount of membranous exudation in the fauces. During the seventh and eighth days, the boy continued very sick. He was drowsy, almost comatose; the eyes were half open and the conunctivæ minutely injected; there was an abundant coryza, the discharges being composed of offensive mucous and sero-mucous fluid, with an admixture of pus and of flocculent or grumous particles, the atter consisting evidently of broken-down membranous exudation. There was no otorrhœa. The pulse rose from 120 to 128. During the night of the seventh day the anginose affection was so severe that the child could swallow nothing from 10 P.M. to 3 A.M.; fluids poured into the mouth ran out again in part, and were in part returned through the nostrils. On the tenth day there was still no decided improvement, except that the pulse had fallen to 112. The coryza continued as before; the fauces were covered thickly with whitish exudation; the deglutition was a little easier. The drowsiness continued, as the child dozed nearly all the time, merely rousing from time to time to take drinks, and then, in spite of all solicitation, sinking into sleep again. The abdomen was tympanitic. The urine was rather free, more so than it had been before, and it was also clearer and of a lighter color. By the twelfth day there was a decided improvement; the pulse had fallen to 106, and the child was not quite so heavy. The act of swallowing was easier, and the fauces showed less of the plastic exudation, but they were still very much coated with tenacious mucus. On the thirteenth and fourteenth days the patient continued to mend. The pulse fell to 98 and 92; the fauces had become clear of the exudation, and presented instead an excoriated and ulcerated appearance. The secretions into the fauces were less viscid and less copious. The coryza had diminished, and the discharges had become first muco-purulent and then mucous. The drowsiness had diminished, so that he waked spontaneously and began to ask for his toys. He now began to demand food, but refused to eat when things were brought to him. On the fifteenth day he was extremely irritable, screaming most violently for the slightest causes. On the sixteenth day the pulse was 92, and the skin nearly natural as to temperature. He was now exceedingly emaciated and very weak. The orifices of the nasal passages were very much irritated and incrusted, but there was scarcely any coryza. The tongue was clean, pink in color, and moist, the thirst not too great, and there was a little appetite. The temper was improving. From this time forward the child improved steadily but slowly, so that he sat up for the first time on the twenty-seventh day. He was as much emaciated at that time as after violent typhoid fever.

The reader must not, however, suppose that all grave cases present throughout their whole course, symptoms so dangerous as those which marked the two examples that have just been detailed. In some, on the contrary, the symptoms, though of such a character as to deserve and require the title of grave, are of a much milder kind. In order to make this part of our description of the disease as clear as may be, we will relate the following as an example of a grave case in which the symptoms, though severe, were neither malignant, nor at any one time very dangerous to life. A girl between seven and eight years old was well at breakfast. In the course of the morning she complained of sore throat, and of not feeling well, and at 4 P.M., when we saw her, was quite feverish, with a frequent pulse and hot skin, and showed already a well-marked but rather faint scarlet rash upon the trunk of the body, and about the elbows. On the following day the trunk and upper parts of the limbs were covered thickly with an intense eruption, of a bright scarlet color. The fauces were very red, somewhat roughened and a good deal swelled. The only nervous symptom present was severe frontal headache. There was no unusual agitation, no drowsiness, and nothing like convulsive movement. On the evening of this day, the pulse had run up to 168, and was rather full, but not hard. The skin

exceedingly hot and burning; during the night there was great
lessness, and the child was wakeful and occasionally delirious. On
third day the symptoms continued much the same, except that the
se was down in the morning to 152, that the rash had extended to
hands and feet, and that some small spots of whitish exudation
e now visible on each tonsil. On the night of this day the fever
in increased very much, and the child was again delirious. On the
rth day the pulse was 148; the exudation had increased so much as
over a good portion of both tonsils, and it had extended also in a
ht degree to the posterior wall of the pharynx. There was now a
siderable enlargement of the lymphatic glands situated at the angle
he jaw on the left side, and a smaller one on the right side. Deglu-
on was somewhat painful, and a little difficult, but not seriously so.
e case continued in much the same way until the seventh day, when
pulse had fallen to 132, and the eruption had faded very much on
trunk of the body, and, to a considerable extent, upon the limbs
o. The fauces now exhibited the false membrane over the whole of
h tonsils, over the half-arches, the sides of the uvula, and upon the
er portion of the posterior wall of the pharynx. Instead of being
itish and clean-looking as at first, however, the false membranes
w looked exactly like sloughing portions of the mucous membrane.
ey were of a dirty brown color, softened, and seemed to be detach-
themselves like sloughs from the tissues beneath. On the ninth
y the patient was much better, the pulse having fallen to 116; the
ption had almost wholly disappeared; the heat of skin was very
ch reduced; the dark-colored portions of false membrane had dis-
peared from the fauces, leaving the mucous membrane beneath red,
oriated, and in parts ulcerated. On the thirteenth day, the child
s convalescent, the pulse having fallen to 96, the heat of skin having
appeared, and the throat being nearly well. The appetite had re-
ned, the temper was serene and cheerful, and the patient was, in
t, well, with the exception of weakness, and some remaining sore-
ss of the throat.

Laryngitis has been supposed by some persons to be of frequent oc-
rrence in the course of the disease, while others assert that it rarely,
ever, occurs. M. Bretonneau has never met with it. M. Rayer says
does not know that the exudation has ever been found in the larynx
trachea. Tweedie (*Cyclop. Pract. Med.*, Art. Scarlatina, p. 640)
tes that in the dissections he has made he has not seen an instance
the membranous exudation extending into the larynx. That it does
metimes occur, is proved nevertheless, beyond a doubt, by the evi-
nce of MM. Guersant and Blache, Rilliet and Barthez, and others,
d by our own observation. MM. Rilliet and Barthez report three
ses in which it was found in the larynx after death. These gentle-
en state, however, that they have never observed the peculiar symp-
ms of croup. This does not accord with our own experience; for in
veral cases that we have seen, all the peculiar symptoms of that
alady were present during life. The subject of one of these cases

was a boy two years of age. A few days after the invasion of
ease, a severe and extensive pseudo-membranous angina was de
This was soon followed by all the symptoms of croup—hoarse
stridulous respiration, weak, feeble cry, dyspnœa, and whispering
which lasted about five days, when the angina and croupal sym
both diminished very much, and the child seemed in a fair way
cover: suddenly, however, extensive tumefaction of one side
neck took place, and he died in twenty-four hours. Unfortunat
examination could be made. In another case, in a child betwe
and seven years old, who had a most violent attack of the di
severe croupal symptoms set in on the eighth day. They consis
harsh, croupal cough, stridulous respiration, and great difficul
swallowing, and the act of swallowing occasioned much harsh
and strangling. The symptoms continued on the ninth day, after
they moderated, and the child finally recovered entirely. In a
case, also a violent one, in a boy between eight and nine years ol
in which general convulsions occurred on the first and second day
symptoms had improved a good deal on the third or fourth day.
the fifth day he was not so well, being more restless and heavy
having much difficulty in breathing, with some croupiness of
These symptoms increased rapidly until they gave rise to most
fits of suffocation, and caused a fatal termination on the sixth day
a fourth case, in a child nine months old, death occurred on the
teenth day from laryngitis, occurring in connection with membra
angina. The fatal termination was preceded by hard, dry, and
cough, stridulous respiration, and great difficulty of deglutition.
fifth, in a child under a year old, croupal symptoms made their ap
ance on the sixth day, the fauces being at that time covered with
branous exudation, and they caused or assisted to cause a fatal
nation on the eighth day. In yet another case, the subject of
was between one and two years old, a grave attack of scarlet feve
entirely recovered from. At the end of the second week the chil
seized, owing to improper exposure in a cold house, against whic
parents had been properly warned, with anasarca. This also
covered from, and again the parents were warned against imp
exposure. On the very day after our last visit, however, the chil
taken down stairs into a room with the windows open, and this
mild day in the month of February. The child was seized now
diphtheritic angina, and died, after a few days, of croup. This
the fourth week from the onset of the scarlet fever. In a seventh
severe from the beginning, the patient recovered so as to be appar
out of danger, but, owing to the room being very cold from the
that it was large, with wide rattling windows down to the floor,
from the fire being too small, the child took cold, and, at the end
third week, was seized with severe croup, which had many of th
tures of membranous croup, but which was, in all probability,
modic croup, dependent on ulcerative laryngitis. The case conti

even days, during which time the patient was violently ill, but finally, fter a most dangerous struggle, it ended favorably.

The symptoms which indicate a disposition to implication of the arynx are frequent, hoarse, and croupal cough, hoarse, and whispering oice or cry, aphonia, and dyspnœa with stridulous respiration.

The *duration* of grave cases of scarlet fever is very uncertain. In me the disease runs its course with frightful rapidity, destroying life ithin a few hours or days. In others, though the symptoms of the rly stage may seem to be as violent as in those where death occurs a very short space of time, the patient either lingers for several ys or two or three weeks, and then dies, worn out by the violence malignancy of the attack, or else, after a most dangerous and parently desperate illness, he finally struggles through and recovers.

In the most violent of the grave cases, those which we described first forming a separate group, 18 in number, of which 13 proved fatal, e duration in the fatal cases was between eighteen hours and six days. the 13, 2 proved fatal in eighteen hours, 1 in twenty-four hours, 2 in rty-six hours, 4 in three days, 1 in four days, 1 in five days, and 2 six days. Of the 5 favorable cases, 1 lasted three weeks, 1 four weeks, ix weeks, and 1 two months.

Of the less violent of the grave cases, 43 in number, 15 died, and 28 covered. Of the 15 fatal cases, 1 died in four days, 2 in five days, 2 seven days, 3 in eight days, 2 in thirteen days, 1 in fourteen days, 1 fifteen days, 2 in four weeks, and 1 in five weeks. Of the 28 favorle cases, the duration of the shortest was seven days. The remainder ted from twelve days to six weeks, the most common period being tween three and four weeks.

COMPLICATIONS AND SEQUELÆ.—*Dropsy.*—This is one of the most freent and important sequelæ of the disease. We have already rerked that in a considerable proportion of cases, the exact number parently varying somewhat in different epidemics, the urine becomes uminous during the stage of desquamation. This, however, is usuy transitory, and probably depends partly on the condition of the od itself, and partly on renal congestion. But in some cases, owing one of the causes to be mentioned hereafter, the albuminuria perts, or if it has not been present or has disappeared, again makes its pearance; and the symptoms of acute nephritis develop themselves. nong these the most striking one is dropsy, and, indeed, so prominent is it, as to have alone attracted attention for a long time, and only have comparatively lately been associated with a lesion of the dneys.

Certainly, in the vast majority of cases, when dropsy appears as a quel to scarlatina, the urine will be found to present all the characrs present in acute Bright's disease; and yet there are some high thorities (Simon, Becquerel, Philippe, Rayer) who assert that marked opsy may occur without the slightest albuminuria. It is possible that me of these cases may be explicable by the fact that the urine has ly been occasionally examined, and that albumen may have been temporarily present but have been overlooked; but it at preser undeniable, that, in some instances also, dropsy may appear any abnormal condition of the urine whatever. It is probable these cases, the dropsy depends upon an anæmic state of the bl veloped during the course of the disease.

The frequency with which dropsy is developed, varies greatly ferent epidemics and in different forms of scarlatina. It occurr fifth of the cases of MM. Rilliet and Barthez, and in 31 of the in about a ninth, of those observed by ourselves. It occurs ge in the course of the second or third week of the disease, and the process of desquamation. It is thought to follow cases of mo severity much more frequently than those of a grave characte Tweedie states that it has never been observed to succeed a mal attack. This does not, however, accord with our own experienc of the 31 examples that we have seen, 8 occurred in grave cases disease. Still it may be said on the whole, that the susceptibil renal disease bears an inverse proportion to the activity and co development of the symptoms of scarlatina. The effusion may any one of the cavities or the cellular tissue of the body, or all a The most common form in which it appears is anasarca, after the most frequent are, in the order in which they are men œdema of the lung, hydrothorax, ascites, and hydropericardium.

The *exciting cause* of the dropsy is generally believed to be co tracted usually by exposure to air and moisture at too early a We have rarely known it to occur when the patient has been c to the chamber or house until after the twenty-first day; while, other hand, we have seen it to follow immediately upon a ride weather on the fourteenth day, the child having apparently be valescent for several days before. We have known it to occ when the child has been allowed to run through the house exp draughts from open doors and windows.

We have been able, in a number of instances, to trace it direct obviously to cold. Thus, in one very marked example, a boy b six and seven years old had had a mild attack of the disease, a so entirely recovered that we ceased our visits on the tenth da ing strict injunctions with the mother as to the necessity of co the child to the house for at least ten days longer. On the four day, he was allowed to sit for fifteen minutes, late in the aftern a cool April day, on the marble front-door step. He was seiz night with fever and vomiting, had anasarca next day, and, dur illness of two weeks, had dropsy of the pericardium, effusion in right pleural sac, ascites, and some signs of uræmia. In anothe a boy eleven years old had recovered entirely of a mild attack slept in a room heated by a stove. On the nineteenth day, the w being cold, he got up early in the morning to light the fire whi gone out accidentally. He was attacked that day with bronchit was, on the following day, anasarcous. In another instance, an was produced at the end of the third week, the child being qui reviously, by his being taken into a cold room to sleep. We could te other instances of the same kind, but these are enough. It it suf- cient to say that in a large majority of the cases that we have seen, it as manifestly and obviously followed improper exposure during the econd or third week. In a few cases, however, it has come on with- ut any imprudence whatever, and we have been entirely unable to as- rtain the cause.

Nor can it yet be asserted positively that the action of cold will fre- ently cause dropsy unless the urine have been previously albumi- us: although it is undoubted that when albuminuria is present, any prudent exposure will insure the occurrence of dropsy.

We are in the habit now of always directing the mother or nurse to p the patient confined to the chamber for four weeks from the onset the disease, or, if it be allowed to run through the house, to take e to have it well clothed, and to keep the windows and doors care- y closed should the weather be cold or cloudy. This direction is of the most important to be given in the course of the disease. It ht to be insisted upon in all and every case, occurring in the cool son of the year.

he question was formerly much discussed, whether the condition of kidney which accompanies scarlatinal dropsy was one of the forms renal disease known as Bright's disease. Dr. Johnson suggested t it was a peculiar affection of these organs, characterized by a des- mation of the epithelium of the tubules, for which he proposed the ne of desquamative nephritis. Recent observations have, however, wn that there is in reality nothing specific in the lesion, but that it dentical with other cases of renal catarrh or tubal nephritis, to use excellent name bestowed by Dickinson, occurring from whatsoever se. Indeed, it may be said that in almost 75 per cent. of all cases hronic renal disease in children, the cause of the affection has been rlatina, and the form of the lesion is that which we have above men- ned.

arious causes have been assigned for the frequent development of al nephritis in the course of scarlatina. Thus it has been supposed t the affection of the kidneys resulted from inaction of the skin, ng to the intense congestion which attends the eruption; but clin- experience shows that it is precisely in the cases where the affec- n of the skin is most intense that the kidneys are least disposed to ease. It would rather appear that when the action of the virus is fully determined to the surface, there is violent congestion of the neys established, which, especially when the patient is exposed to action of cold, may result in the development of tubal nephritis.

Morbid Anatomy of the Kidneys.—When death occurs in the acute stage the renal disease, the kidneys are found enlarged and very heavy. s surface is smooth and injected; on section, the organ drips with od; the Malpighian bodies are congested, and appear as red dots; l the vessels of the cortex and cones are gorged with blood. The ules are distended with granular epithelium, granular matter, or

fibrinous plugs. The cortex appears coarse-grained, and pres
mingled dots or streaks of red and buff color. In the mor
form of the disease, the kidney is also much enlarged and ve
its surface smooth, and pale, or dotted with congested stella
The capsule is not thickened, and is readily removed. On sec
little blood escapes; the cones retain their pinkish or red col
the cortex is coarse-grained, thickened, and of a peculiar opa
color. The Malpighian bodies may be distended, owing to ob
to the escape of the blood. The principal lesion, however, is s
within the tubules, which are stuffed with epithelial cells, or w
ular matter resulting from their disintegration; occasionally,
rinous plugs are also seen occupying their calibre. It freque
pens that the epithelium undergoes fatty degeneration, and w
is marked, the cortex acquires a yellowish tint. According t
son, there is less tendency to this change in cases of tubal
following scarlatina than after other causes; a circumstance
thinks may possibly account for the comparatively curable
scarlatinal dropsy.

The *dropsical symptoms* usually show themselves in the third
week of the disease, and are generally preceded for a few day
minuria. In most of the cases that we have seen they occur
third week, but they sometimes appear at the end of the se
sometimes not until the fourth week. In one case they show
selves first on the thirtieth day, after the child had been e
too cool a temperature in an insufficiently warmed room. Th
therefore, as a general rule, during the stage of desquamati
attack is sometimes very sudden, but in most instances it is
gradual. The effusion is not commonly the first symptom obse
the contrary, the dropsy is almost always preceded for one or
by the signs of a more or less considerable constitutional dis
The patient has usually passed safely through the eruptive sta
fever, and has been considered for several days as convalesce
we have already remarked, the dropsical affection is much m
after grave than after mild cases. The child has perhaps bee
about the house, or it has even been out, the parents supposi
warned by the physician, from the disappearance of the fever
symptoms of illness, and from the return of appetite and ga
complete recovery has taken place. But, either after some
or sometimes without any appreciable cause, the child becomes
languid, and irritable, or uneasy, peevish, and restless. Simult
with or very soon after these symptoms, fever sets in; the
comes dry and heated, and there is usually an elevation of
perature to the extent of 4° or 5°; the pulse is frequent and
it is frequent and jerking; the appetite is diminished or lost,
is more or less thirst; the bowels are generally constipated;
is usually diminished; and there is not unfrequently some
vomiting, and complaints of headache.

The symptoms which precede the appearance of the effusio always, however, so marked, while in other instances they are scarcely noticeable, and yet the effusion may take place suddenly, and, affect- g the subcutaneous cellular tissue and different internal organs simul- aneously, may cause a fatal termination with frightful rapidity.

The effusion usually commences in the face, which becomes slightly wollen. The amount of the effusion is sometimes very slight, leaving s in doubt even whether there is really any or not. The swelling is ost marked about the eyelids, which look puffed, and it may be con- ed entirely to them, or, at least, it may be only in them that we can el sure of its existence. From the face it extends to the hands and et, and either remains limited to these parts, or spreads over the hole surface, and gradually or rapidly to the internal organs. The in over the parts in which the effusion has taken place is firm, hard, d elastic to the touch; it does not generally pit, at least not in the rly stage, and it is of a dull white color.

In very mild cases the constitutional disturbance is usually but slight, d the effusion may be so small in such instances, as to leave us in ubt as to the cause of the sickness. Generally, however, we have en able to determine the cause of the fever by a careful examination the face, and particularly of the eyelids, which look a little swelled d distended, and by the presence of a slight puffiness or cushiony ap- arance of the backs of the hands and feet. In such cases the general mptoms usually pass away after a few days; the urinary secretion, ich had been diminished in quantity and of a deeper color than nat- al, becomes again healthy; the anasarca disappears, and the child turns to its ordinary condition. In more severe cases the general mptoms are all more marked; the anasarca is more extensive and e swelling more considerable; the child, if old enough to describe its nsations, complains of pain in the back, and the lumbar region is ten- r to the touch; the urine exhibits much more marked changes in its aracter; but still, unless some important internal cavity be attacked, e symptoms diminish after a week or ten days, and the child recovers adually. In still more violent cases, the amount of the effusion is very rge indeed, the face is disfigured by the swelling, the limbs are largely stended, the cellular tissue of the trunk of the body is infiltrated, the antity of urine discharged is very small or the secretion is arrested tirely for one or several days, and the fever is high. If the disease not removed, the effusion may extend to the internal organs: to the ng, producing œdema of that organ, to the pleural sac, causing hydro- orax, to the pericardium, to the peritoneal cavity, or to the brain. ath may occur in these violent cases from asphyxia occasioned by dema of the lung, by hydrothorax, or by the obstacle to the circula- n caused by the presence of the effusion in the pericardium; from drocephalus, or, finally, the patient may sink into a comatose state e that which often precedes the fatal termination of Bright's disease the adult, and due, like that, to uræmia.

It sometimes happens, as was stated above, that death occurs with ry great rapidity. MM. Guersant and Blache have known it to end any convulsive movements, and finally recovered as the kidneys ained gradually their secretory function. In many other cases that e come under our observation, especially those which we have seen latter years, when we have watched this symptom more carefully, diminution of the urine has been very great, so much so as to con-ute a most marked and reliable symptom.

n mild cases, when the diminution is not very marked, the urine is a deeper color than natural, but retains its transparency when first ded. It is apt, however, to become turbid on cooling, and to deposit ore or less abundant precipitate of urates. Its reaction is acid; its cific gravity increased in proportion to the concentration; and urea the chlorides are much diminished. Albumen is present, and micro-pic examination shows epithelial or hyaline casts of the renal tubules, al epithelium, and blood-globules. In more severe cases, the urine very much diminished in quantity, the color is either a very dark , or has a blackish or brownish tint, or is like smoke or soot; the cific gravity is very high; the amount of albumen large, and the cipitate contains many casts and blood-globules, mixed with abun-t urates.

The amounts of albumen and blood bear no definite relation to each er; in some cases, the albumen may be abundant without any blood ng present; while in other cases, with a large precipitate of blood-bules, the urine may contain but a moderate amount of albumen.

Basham calls attention to the occasional development of a bluish-green, d subsequently greenish-black color, on the addition of nitric acid to heated urine, as a sign of very grave augury, being associated with tensive and advanced renal disease.

The duration of this stage of diminution of urine varies greatly in ferent instances, and is, to a certain extent, indicative of the future ogress of the case. It is succeeded by a stage in which the urine be-mes abundant, even exceeding the normal amount, the specific gravity ls, and the urea and chlorides return to the normal figure, but albu-n is still present, the smoky color is apt to persist, and the precipi-e which forms on standing contains renal epithelium, blood-globules, d granular or epithelial casts.

In favorable cases, the smokiness and albumen now gradually disap-ar, the urine often continuing for a little while to be secreted in ex-ssive quantity: but in other cases, and unfortunately they are but o frequent, the albumen persists, and the urine assumes the characters dicative of chronic Bright's disease.

The form which the dropsy takes varies greatly in different cases, d seems to depend on inappreciable causes. Of the 29 cases that we ve met with, in which its distribution was noted, anasarca alone was esent in 22. In 1, there was extensive anasarca, hydrothorax of the ght side, hydropericardium, and ascites. In 5, grave cerebral symp-ms, probably uræmic in character, were present; and in 4 of these asarca also existed. In 1 there were also hydrocephaloid symptoms, t of much less violent form.

Recent researches have established the fact that most of the cases for-

In some cases, chronic angina remains after the subsidence of the dis- se; so, too, coryza may persist, even taking the form of ozæna.

Otorrhœa is a not infrequent sequel, and when following angina, and e to the extension of inflammation up the Eustachian tube, may be sociated with permanent deafness, necrosis of the temporal bone, cial palsy, and even abscess of the brain.

Occasionally during the desquamative period, a painful swelling of joints appears, attended with a renewal of the fever and, frequently, th sweating. This form of rheumatism is in all probability connected th the imperfect excretion of some excrementitious substance, owing the state of the various emunctories. In rather rare cases, the in- mmation of the joint runs on to fatal suppuration.

Bronchitis and pneumonia are rare. *Inflammation of the serous mem- anes* is more common, occasioning in some cases the dropsical effusions hich have already been treated of. It is in most cases connected either th renal disease or with the form of rheumatism above described. he pleura is more frequently affected than any other of the serous embranes; and not rarely the effusion becomes purulent.

Inflammation of the investing or lining membrane of the heart also casionally occurs. Thus, of 39 cases of endo- or pericarditis men- oned by Dr. West, 6 could be traced to an attack of scarlatina.

Peritonitis is much more rare, and the effusion here also is especially t to be purulent.

Scarlatina may be coincident with variola or measles. We have never en it in connection with the former, but in two cases which came der our observation it was complicated with measles.

Diphtheria has also been observed not very rarely, usually appearing ring convalescence. In a considerable number of cases, scarlatina s been noticed in the course of typhoid fever.

In some rare cases, as in the one detailed under the head of progno- s, more or less complete paralysis ensues during the convalescence om scarlatina.

Tuberculosis is not nearly so apt to be developed after scarlatina as ter either rubeola or typhoid fever.

ANATOMICAL LESIONS.—The eruption sometimes disappears entirely ter death, and on other occasions assumes a deep livid or purple ap- arance. The epidermis is generally loosened upon the integument, as to be peeled off with great facility. The most important lesions, d those which seem to belong to the nature of the disease independent complications, are the altered condition of the blood, and congestions different parts of the body, particularly the brain, serous membranes, dneys, spleen, glands of Peyer, and intestinal follicles. We have ready alluded to the fact that, even when the cerebral symptoms have en most severe, and we might expect to find evidences of violent in- mmation of the brain, nothing is observed after death, in the majority cases, but congestion of the large veins and sinuses of the brain, of e pia mater, or of the cerebral substance. There is rarely any un- tural amount of serous effusion into the ventricles, or meshes of the a mater; and it is evident that the symptoms have been due entirely *ude all those of the first stage of enteric fever, and are so far identical th them.* And it follows, therefore, that the transition from the former sease to the latter is nothing more than a natural pathological se- ence, readily determined by any cause which may increase the intes- nal irritation." The italics are Dr. Harley's.

We have, on a few rare occasions, known cases of scarlet fever in our ivate practice, where the disease has been prolonged beyond its usual riod, to assume some of the phenomena of typhoid fever, but this currence has been so infrequent that we doubt whether it ought to regarded as the natural evolution of a pathological law connecting e two affections. That typhoid fever may attack a child just recov- ing from scarlet fever is as probable as that measles and scarlet fever ay directly follow each other, or even coexist at the same moment. both of these accidental coincidences, we have seen a few well- arked examples. Several of the cases described by Dr. Harley, in hich typhoid fever certainly followed scarlet fever, occurred in patients mitted to hospitals. Five occurred in the London Fever Hospital, nd in some of these the attacks of enteric fever began after full nvalescence from scarlet fever; in one on the 28th day of convales- nce; in a second on the 31st day; in another on the 37th day; in nother on the 32d day; and again on the 56th and 32d days. We ould ask whether in such cases the sequent typhoid fever ought not be explained as the result of fever-poison imbibed during the resi- ence in the wards of a fever-hospital.

One very interesting fact observed by Dr. Harley, is the frequency ith which he found fibrinous clots in the heart and great vessels, during a pyrexial state, at any period of the disease. This," he states, is the commonest cause of death during the early stage of scarlatina; is indicated during life by the reduction, often sudden, of a full pulse about 120, to a dribble of 150 or 160 almost imperceptible impulses. he failure of the heart's action is commonly attended with orthopnœa nd delirium from obstruction to the pulmonary and cerebral circula- ons. On opening the body before it has lost a degree of temperature, nd while the hot blood is still fluid, the right heart will be found dis- ended, partly with dark fluid blood, which coagulates on exposure; and artly, sometimes chiefly, by a large, firm, white, bifid clot continuous rough the auriculo-ventricular opening. Each portion is interlaced ith, and firmly adherent to the tendinous cords and outstanding mus- ular bands of the cavity in which it lies, and sends outwards a rope- ke continuation, the one into the pulmonary artery, and the other to the superior cava. These processes not only occupy a large por- on of the area of these tubes, but extend with their branches, up- ards into the cranial cavity, and outwards into the lungs, whence ey may often be withdrawn in ramifications up to the eighth degree, d eight or nine inches long.

"The left heart was generally empty and firmly contracted; in one se (1) each cavity was occupied by a large fibrinous clot, that in the ntricle spreading into the brachio-cephalic vessels of the arch of the *ola* and scarlet fever. By the eruption alone, we believe it to be n impossible. We have seen quite a number of cases in which the ption of roseola resembled so closely that of scarlet fever, that we uld have been obliged to confess our inability to make the distinc- had it not been for the other symptoms, and particularly the fre- ncy of the circulation, the heat of the skin, and the throat symp- s. The most important differential symptoms are the tint of the ption, which in roseola is rose-colored, in scarlet fever bright-red or let; the characters of the patches of eruption, which are more reg- in shape, but of much smaller size in roseola than in scarlet fever; absence or very slight degree of anginose inflammation in roseola; , what is decidedly the most important of all, the very much slighter ree of febrile reaction in roseola, in which the pulse, instead of ng doubled in frequency as it is in scarlet fever, is scarcely above natural rate, and in which the heat of skin is but little above the ndard of health. Moreover, roseola is generally of shorter duration, is a milder affection, and therefore accompanied by far less fever general disturbance of the constitution.

iphtheria occasionally resembles scarlatina to so great an extent, as have even led some observers to consider them identical. Thus, re is in diphtheria a pseudo-membranous angina, with swelling of cervical glands, and at times albuminuria, and even an erythema- s rash. We have elsewhere (see article on diphtheria) given at gth the differential diagnosis between these affections, and will e merely call attention to the fact that the rash is a rare exception iphtheria, and is a mere uniform erythematous redness; that even en albuminuria is present, the urine does not present the other char- ers noted in scarlatina; and that the condition of the fauces in the diseases is somewhat different. There is, further, a wide differ- e in the sequelæ of the disease; and, finally, they do not exercise protective power whatever against each other.

here is a form of disease known as rubeola notha, epidemic roseola, alia (Richardson), in which there are some of the symptoms of both asles and scarlatina; the eruption appearing on the second or third , at first resembling that of measles, but becoming soon more like t of scarlatina. Coryza and angina may both be present, and there subsequent desquamation. Some authorities regard this as a union the poisons of measles and scarlatina, while others consider it a arate disease, because epidemics of it occur when neither measles scarlatina are prevailing. Previous attacks of these latter do not tect against it. In an extensive epidemic in the lower part of this y, which appeared to be of this nature, not a single case, of the mbers which came under our observation, was followed by any of the uelæ of either measles or scarlatina.

ROGNOSIS.—It is impossible to obtain a useful average mortality of rlet fever, since the disease varies so greatly in different epidemics, l under different hygienic conditions, that the results obtained dur- one period are inapplicable to cases observed at another. This is ved by the experience of almost every physician, and by the evi-

dence of many writers. It is proved, also, by the following fact
Gueretin (*loc. cit.*, p. 283) states that the mortality in the epidem
served by him was about 1 in 12; of 99 cases, 8 died. MM. Rillie
Barthez lost a little more than half their cases; of 87, the total, 46
fatal. These cases, let it be remarked, however, occurred in the
pital for Children in Paris, which will account for the heavy fa
The degree, however, to which the mortality may vary in the
place and under the same plan of treatment, is shown by the fact
tioned by Hillier, that in the course of eleven years the annual m
ity from scarlet fever in the London Fever Hospital, varied fro
per cent. to 16.5 per cent.; and in the Hospital for Sick Childr
London, from 9 to 31 per cent. Of the 274 cases that we ha
served, 31, or rather more than one-ninth, were fatal. Of the 274
104 occurred between 1849 and 1853, and in those the mortalit
much smaller than in those which occurred prior to that year. O
11 were fatal, or about one in nine and a half. Seventy-eight ca
curred between 1853 and the spring of 1857. Of these 78, only
one in twelve, were fatal. Of 81 cases observed previous to 18
or about one in six, proved fatal. Of 11 cases occurring in 187
proved fatal. The mortality met with by ourselves in private
tice has greatly varied, therefore, in different series of years. I
series it was 1 in 6, in another 1 in 9½, and in a third 1 in 12. L
to show the influence of the epidemic type upon the mortality still
clearly, we may state that of the last series of cases observed,
number, 43 occurred during the epidemic which lasted from the
mer of 1856 to the spring of 1857, and of these only 3, or 1 in 14.

The prognosis must be based, therefore, in part on the charac
the epidemic prevailing at the time. It must depend, also, on the n
of the case. Mild and regular cases are rarely fatal. Of 206 mild
that have been under our care, only three proved fatal. One of
would probably not have so terminated had it not been for the i
dence of the nurse. This was, in fact, the case of a young child
had recovered from the eruptive stage of the disease, but who
nurse carried out of the room in the second week, notwithstandin
press directions given her to the contrary. The child took col
was seized with catarrh and slight anasarca; on the fifteenth day u
symptoms set in, and he died on the seventeenth day, comatose
with convulsive movements of different parts of the body. The se
case was that of the boy thirteen years old, already described, who
with sudden hydrocephaloid symptoms, at the end of the second w
The third fatal case occurred in a girl between eight and nine y
old, who died suddenly at the end of six weeks. The patient had
valesced sufficiently to have been out several times, but remained
hydræmic and weak. After being much fatigued one afternoo
playing with some little friends, she was seized next day with vomit
and soon after with great difficulty of breathing and extremely r
and feeble action of the heart. These symptoms increased on the
lowing day. The dyspnœa was most severe, and was attended w

anotic color of the hands and face, and with cold colliquative sweats.
e lungs were free, there was no cough, and auscultation revealed no
ricardial lesion. Death occurred suddenly at the end of a day and a
lf. No post-mortem was made, owing to circumstances that could
t be controlled. Our own opinion was, and is, that the death was
used by a coagulum in the heart.

Grave cases of scarlet fever are always, on the contrary, exceedingly
ngerous: thus of 61 cases of this kind that we have had under charge,
, or nearly a half, were fatal. In order to render the description of
e symptoms of this class of cases more clear, we divided them into
o groups; one, in which the onset of the disease is instantaneous and
ost violent, being characterized by excessive disturbance of the nerv-
s system, taking the form usually of convulsions, but sometimes only
profound coma; and a second, in which the symptoms of the onset,
ough severe enough usually from the first to mark the character of
e case as grave, are less violent than in the first group, and especially
t marked by the occurrence of convulsive phenomena. Of 18 cases
longing to the first group, 13 died; while of 43 belonging to the second,
died. Violent nervous symptoms occurring early in scarlet fever
gur, therefore, great danger to the patient, since of 18 cases in which
ey were present, 13 died, whilst of 43 in which they were more moder-
e, though still marked and severe, only 15 died.

The character of the nervous symptoms is, therefore, all-important in
e determination of the prognosis, as the probable termination of the
se is to be foretold more certainly by a just appreciation of these par-
ular phenomena of the disease, than by any other means. Excessive
titation or irritability, delirium, coma, and the hydrocephalic cries,
e all unfavorable symptoms, but not in the same degree as are those
nnected with the locomotor apparatus. MM. Rilliet and Barthez
ate that they have seen recoveries take place in cases in which the
telligence of the patient had been very much disordered, while of
ose who "*during the first fifteen days of scarlatina*, were taken with
nvulsions, convulsive movements, contractions, in a word, any symp-
ms affecting the locomotor apparatus, all, without exception, died."
his does not accord exactly with our own experience, though nearly
ough so to show how exceedingly dangerous are the symptoms just
umerated when they occur early in the disease. General convulsions
curred on the first day of the disease in 9 of the 61 grave cases observed
ourselves, and of these not one terminated fortunately; in four they
curred on the second day, and of these three recovered and one died;
one they occurred on the ninth day, and this patient also recovered;
another case there were no general convulsions, but on the first day
ere were automatic motions, with involuntary extensor motions of the
ms and fingers, and on the second day strabismus, with a continuation
the automatic motions. This case proved fatal. Of the 15 cases, there-
e, in which marked disturbances of the muscular system occurred, only
nded favorably. Of 10 subjects in which the convulsive phenomena
urred on the first day of the disease not one escaped. Of 5 subjects

e general convulsions, followed by very deep drowsiness. The ion became intense, and, on the third day, the convulsive symp- recurred from time to time, but with less violence. On the fourth ie seemed somewhat better, but on the fifth very severe anginose toms set in, and he died.

ain, in 20 of the 61 grave cases, severe and more or less prolonged ium or coma occurred, and of these 14 died. We may conclude, fore, that convulsive symptoms appearing early in scarlet fever ate a highly dangerous and, in all probability, a fatal attack; while e, and especially prolonged delirium or coma, are also extremely vorable symptoms, but somewhat less so than are those of a con- ve character.

her unfavorable symptoms are: extremely frequent or very vio- pulse; intense heat or unnatural coolness of the skin; persistently ted temperature after deflorescence; deficiency or sudden disap- ance of the eruption; a livid or purple tint of the eruption; slow imperfect capillary circulation, as ascertained by pressure; the ap- ance of petechiæ, ecchymoses, or hemorrhages; violent vomiting olliquative diarrhœa; great violence of the throat-affection, whether tumefaction, great abundance of pseudo-membranous exudation, sposition to ulceration and sloughing; and lastly, severe coryza or hœa. A disposition to a typhoid state, indicated by dulness of ntelligence, dusky hue of the skin, frequent and feeble pulse, dry, n tongue, sordes on the teeth, meteorism, and disposition to diar- , is always dangerous.

hen, on the contrary, the fever is moderate, the cerebral symptoms nt or very slight, and the eruption regular, and of a bright tint; there is no disposition to typhoid symptoms; when the throat- tion is mild, and the disease pursues a regular, uniform course, we every reason to expect a favorable termination in a large majority ie cases.

addition to these remarks it may be said that neither age, sex, nor l position influence the prognosis. A delicate constitution does seem to predispose to a violent attack of scarlatina, and indeed, y of the most malignant cases occur in very robust children; but, he other hand, it has been noticed that in certain families there is a strong tendency for the disease to assume a grave and fatal .

EATMENT.—*Hygienic treatment.*—In all cases of the disease, whether e mild or grave kind, the strictest attention should be paid to the enic condition of the patient. The room in which the child is d ought to be, if possible, large, and at all events well ventilated. temperature in winter should be carefully attended to. We usu- direct it to be kept at from 68° to 70° F., during the early stages e disease, unless the fever is violent and the child complains of in which case it may be allowed to fall to 66°, or even 62°. The ing ought to be moderate, not enough to increase the heat of the nor yet so little as to endanger chilliness. During the latter stages of the disease, when the fever has subsided, and partic when the heat of the skin has fallen, the temperature of the ch ought to be kept, as a general rule, at from 68° to 70°, and, whe child is pale, weak, and chilly, it may be maintained with grea priety at 72°.

One of the most important points in the treatment of scarlet fe undoubtedly, the management of the patient during the convales and especially during the desquamative period. It is during this that the child is liable, as we have already shown in our account different complications and sequelæ of the disease, to dropsy, wl the most frequent, and at the same time the most dangerous ac to which the patient is exposed. There can be no doubt, we from the opinions expressed by various writers, and also from o experience, that the most common cause of this accident is ex to cold. Chilling of the body, no matter how produced, is excee apt, when it occurs within three, or, more rarely, four weeks fr invasion of scarlet fever, to be followed by a more or less marl tack of some form of dropsy. It is true, we are well aware, tha sical effusions sometimes take place in subjects who have been g in the most careful possible manner, and in whom there has been dent exposure to cold; but it is also true, that a much larger nur those who have been thus guarded, escape, than of those who thus taken care of. We have, therefore, no doubt whatever, th most wise and prudent to confine the patient to well-warmed room least to the house, for twenty-one or twenty-eight days from the of the disease. The fact that the attack has been a slight o makes it the more necessary to carry out this regulation, as it h found by experience that dropsy occurs more frequently after mi after severe attacks. M. Legendre (*Recherches Anat.-Pathol.*, p. of opinion that the patient ought not to be allowed to leave the until the skin, completely deprived of the old epidermis, shall h gained its suppleness, its smooth and polished appearance, and functions. When, therefore, after a mild case, the desquama completely terminated in three weeks, the patient, he thinks, allowed to go out. But, on the contrary, this period would be to by one-half, if the eruption had been very intense, as the desqua is, in such cases, scarcely finished on the hands and feet at tha Our own opinion, as already stated, is, that in the cool sea the year, the patient ought to be restricted to the house duri four weeks.

Treatment of Mild Cases.—Mild cases of this disease, th which the eruption is moderate in degree, the temperature bu above the normal point, even though the pulse be very frequ which neither delirium, stupor, nor unnatural jactitation betray ening conditions of the nerve-centres, need but the simplest trea The child must be confined to a comfortable, well-ventilated room cooling drinks, as cold water, lemonade, or orangeade, shou allowed, and indeed they ought to be recommended, and the uld be made to understand that she is not to wait until a young ld calls out for drink, but that she is to offer it frequently. Young ldren, or at least some, seem not to know when they are thirsty or or cold; they have not yet learned to express their sensations in rds, and a wise nurse or physician will act for them.

n all cases in which there is heat of skin and frequent pulse, and se conditions attend all but a very small fraction of the whole num-, the patient ought to be kept in bed whilst the fever lasts, and for o days afterwards. This point in the treatment of all fevers is a st important one, and is too often neglected. Cases so treated are t to be shorter in their duration, milder in their symptoms, and less ely to be followed by any of the troublesome sequelæ so prone to cur, as inflammations of the cervical glands, of the ear, or of the dneys.

In many mild cases no drug whatever is needed. If the bowels are sitively costive, that is to say, if they are not moved every second third day spontaneously, a simple enema, a dose of syrup of rhubarb, aked apple, or stewed prunes, will suffice. If the temperature is high, e pulse active, and the patient restless and suffering, sweet spirit of tre, solution of the acetate of ammonia, or two or three grains of the rate of potash, with from a half to one drop of deodorized tincture of ium, every two or three hours, according to the age, will usually sen the heat and promote quiet. We wish to repeat, however, our inion that in a great many cases of this type, no drugs whatever are cessary. The time is fast coming when even the vulgar and illiterate ll no longer quarrel with the physician because he gives no drugs, t even in infinitesimal doses, and the time has come when the wise d educated trust the intelligent physician, so that he need no longer e placebos merely for the sake of seeming to earn his fee.

The diet in these cases should be, for the first five or six days, in eat measure liquid. Milk, with or without some farinaceous sub-ance, to suit the tastes or habits of the patient, or with bread and tter, beef or chicken soup, with rice or bread, are sufficient. After e or six days, when no severer symptoms have made their appear-ce, and the disease is on the decline, light meats, eggs, stewed fruits, potatoes, may be added.

Baths, tepid or warm, or spongings with tepid or warm water, cloths etted with cold or tepid water, applied to the forehead, may be used, cording to the judgment of the physician. They are not necessary ents, but in certain cases, when the heat of skin tends upwards, when e patient is very restless from nervous irritation, and particularly if e child is in the habit of being bathed, they may be used with much vantage and comfort.

The throat, in mild cases, rarely needs any special treatment. If, wever, the patient complains of pain, if there be some uneasiness in allowing, or if decided patches of exudation make their appearance the tonsils or pharynx, it will be well to let the child gargle, if it old enough, with solution of chlorate of potash or alum or with flax-

nal solutions to the throat in young children, unless th
necessary to clear the passages of obstructing viscid
cretions. In children of a certain type—those of sen
strong wills, in whom fear of pain on the one hand an
the other form a combination which prompts the child
operation to the last—even though we might hope s
the application, the irritation and exhaustion caused
and the agitation kept up by its expected renewal, w
we think, than the treatment can compensate for.

Inunction, as one of the means of treatment in sca
so well known that we suppose nearly all physicians
part, we order the ointment for external use just as re
as we do cold drinks and proper food.

It was first proposed and strongly urged, we belie
fession, by Dr. Schneeman, a German physician. Dr. S
use of bacon fat. He takes a piece about as large
covered with its rind, in order to obtain a firm grasp
soft side of the piece slits are made in various direc
allow the oozing out of the fat. The patient is to be
as soon as we are aware of the nature of the case, fr
excepting the face and scalp, every morning and eveni
is to be so performed that the skin may be regularly bu
saturated with the fat. During the process only the
is to be uncovered, or the whole can be done under
(*Ranking's Abst.*, No. 12, p. 26.)

For our own part, we used the bacon fat but twice, soo
agreeable an application it was, and not believing tha
tained could do any good whatever. We now always

the various portions of the body being anointed, as is done in
of the *massage* of the French, or by the "rubber" of the English.
manipulations assist, we think, the capillary circulation, which is
good deal impeded. After applying a moderate amount of the
nt, while the skin is well softened and oiled, any excess of the
al should be wiped off with a soft towel or handkerchief. In this
e anointing is thoroughly accomplished, and yet the clothing
d linen are not so soaked and saturated with the oleaginous sub-
as to be disagreeable to the patient, nurse, or mother.

e can be no doubt, at the present time, that the employment of
ion in scarlet fever has proved a most useful addition to our for-
ans of treatment. In our hands it has had the effect of allaying,
ases, the violent irritation caused by the intense heat and inflam-
of the skin. In nearly all cases, it sensibly diminishes the fre-
of the pulse, and in many this effect is very strongly marked.
oves, of course, the dryness and harshness of the skin, keeping
ead, soft and moist. It lessens or even removes the burning,
ion, and itching caused by the eruption. By these effects, to wit,
ng of the pulse, and alleviation of the external heat, dryness,
, and irritation, it cannot but, and evidently does modify and
sh, most happily, the injurious effects of the disease upon the
ution at large. So great is the comfort it gives to the patient
have several times had young children, still untaught to speak,
e signs and motions, at shorter or longer intervals, showing their
to have the application renewed. The frequency of the appli-
must depend upon the case. When the eruption is intense, the
ry hot, and the febrile symptoms marked, they should be made
two or four hours, or even oftener. In milder cases they need
epeated only three or four times in the twenty-four hours.

TMENT OF GRAVE CASES.—The most dangerous cases of this dis-
e those of the type described at page 707, in which the attack is
, and in which disorders of the nervous system in the form of
sions, tremors or rigidity, retraction of the head, delirium,
, or coma appear within a few hours of the onset. When this
f the disease attacks very young children, they, so far as we have
early always die in 16, 24, or 48 hours. Older children have
hance of escape, but, even in them, the danger is extreme.

have seen everything tried in these cases, from depletion by
ng and leeching, many years since, to expectancy, and must con-
at we have little faith in the power of human agency to contend
t this particular array of symptoms. Depletion is no longer, we
e, thought of by any, and there is often no time for the action of

s in such cases that the use of water at different temperatures,
pplied in the form of baths, affusions, packings, ablutions, and ice,
en recommended, and has seemed in some cases to do good. We
give a rapid sketch of the opinions of those who have used these
, and then state our own views.

inflammation and a burning hot skin, without plethora, without depression of nervous energy; but it is inapplicable to the scarlatina of adults, accompanied with coma, phrenitis, or marked debility. It is wholly unfit for cases of cynanche maligna. It answers its purpose very well for the first day or two, but it is often impossible to continue its use. Lastly, it seems to increase the disposition to dropsy."

Dr. Currie's method of using water was by effusion. The child is undressed and placed erect or sitting in a tub, while four or five gallons of water, at from 60° to 70° F., are poured over the head and body. The good effects of the remedy are said to be an immediate reduction of the heat, a diminution in the rapidity of the pulse, which, in one of Dr. Gregory's children, fell in half an hour after the cold affusion from 160 to 120, a disposition to sleep and quiet, and, according to Dr. Gregory, a seeming arrest of the throat-affection. These good effects of the affusions are transient, however, as the heat of skin and rapidity of the circulation return in the course of one or two hours. For this reason it is necessary to repeat them frequently, once in two or three hours at least, in order to render the effects permanent. Currie used fourteen affusions for one of his own children, and twelve for another, in thirty-two hours. These were not, however, all cold. Gregory used for his child five "good sousings," to use his own words, in twenty-four hours.

MM. Rilliet and Barthez give, in the following words, the conclusions of Henke in regard to the use of cold affusions: 1. Cold affusions are not adapted for a *general* method of treatment. 2. The slight, or simply inflammatory forms, do not all demand so energetic a treatment. 3. Their employment must be reserved for cases in which the disease is epidemic, and accompanied by intense heat and dryness of the skin, with smallness and acceleration of the pulse, and for those in which the cerebral symptoms are very violent and characterized by great restlessness, alternating with drowsiness, commencing from an early period of the disease. Scarlet fever under these circumstances is so dangerous, they say, and so often mortal, that recourse ought to be had to all curative means, and in children the cold affusions are much more strongly indicated than bleeding (*op. cit.*, vol. ii, p. 653).

Dr. Hiram Corson, of Montgomery County, in this State, has, so far as we know, used cold externally more boldly than any one in this country. He began this treatment in 1844, and, in a report made by him to the Pennsylvania State Medical Society "On the External Application of Ice to the Throat as a Remedy in Scarlet Fever and Diphtheria" (see *Transact. of the Med. Soc. of the State of Pennsylvania, for the year* 1864), declares his unabated faith in the excellence and safety of the treatment. He advises, in cases attended with convulsions, the pouring of cold water from a height of a few feet on the head for several minutes at a time,—this to be repeated every fifteen or twenty minutes until relief is obtained. At page 467, he says: "Hundreds of times have I had patients brought to the side of the bed and cold water poured freely over the head, until the stupid, almost comatose child, was

e shall now refer to our own experience in the employment of ex-
l cold. We never use it to its full extent except in really dan-
s cases. So long as the case is mild or moderate, or even severe;
ere be no cerebral, and especially no locomotor disturbances, we
it unnecessary, and rest content with more simple means; or we
imply ablutions with tepid or cool water, with cold applications to
ead, so long as they are agreeable, and until the temperature is
ced. But, when the temperature rises very high (105°), or, as
ie states in one case 112°, and Dr. Woodman (Wunderlich on *Med-
Thermometry*, Syd. Soc. ed., p. 204, footnote), 115° F., with nervous
toms, the danger is extreme, and we have used, and shall use here-
, means to reduce the heat. In one case we made repeated affu-
upon the head with water at 70°, pouring at one time seven buck-
s upon the part. This was a case attended with coma, strabismus,
spasmodic retraction of the head. In addition to the affusions,
s dipped into iced water, were kept applied the greater part of the
. These means, especially the affusions, were evidently advanta-
s, and the child recovered.

e have made use of lotions with cool water (70° to 72°) in three
e cases. In two they were evidently useful; in one they did no
, and were perhaps injurious, as we believe now that the case
t have been better treated with prolonged warm baths at a tem-
ture of 92° to 95°, cold to the head, and internal stimulation. The
r case was one in which the patient had two convulsions on the
day, and one on the second. The pulse rose at once to between
nd 170; the head and trunk were very hot, whilst the extremities
coolish; the child was either excessively dull or comatose. Cloths
with iced water were kept constantly upon the head and the body,
ccasionally the limbs were sponged with cold water. The internal
dies consisted of carbonate of ammonia and milk-punch. The
nt improved decidedly on the third day, so that the pulse came
n to 152, the intelligence returned, though the child was still very
sy and heavy, and the case looked quite promising. On the fourth
fifth days, the throat-affection came on; the neck and throat
led enormously, the cervical lymphatic glands became very large,
nasal passages discharged streams of offensive grumous pus, the
ran copiously, the fauces became pseudo-membranous, the deglu-
n grew worse and worse, until at last it was impossible, and the
died on the middle of the sixth day, a mass of the most disgusting
offensive disease. One of the grave cases in which the cool appli-
ns proved useful, occurred in a hearty, vigorous girl, twelve years
ge. On the third day of the attack, the symptoms were as follows:
pulse was between 160 and 170, small and quick; skin intensely
eruption very copious and of a dark red color tending to violet;
llary circulation slow and languid; tongue black, and covered with
rd, dry crust; teeth and lips dry, and covered with dark incrusta-
. There was very great agitation and restlessness, with constant
ning and complaining, and total insomnia. Under these circum-

E.—A very healthy girl, within a few days of two years old, whose sister and two
se cousins had been ill with scarlatina in the same house for some ten days, was
at six in the morning with vomiting. She then slept for a time and vomited
At 9 A.M. she had a convulsion, which lasted, with short lulls, during which
s comatose, until 6 P.M., when one of us saw her in consultation. She was
ery hot, covered with a copious, dark, dingy eruption, and insensible. Despair-
any other treatment, we advised cold externally, and arranged for its use by a
ian, with the thermometer as a guide. Before the treatment could be com-
d, the child became again convulsed and died.

er thus stating the conditions under which we think external cold
be properly used, we must protest against its indiscriminate use in
ses of dangerous scarlet fever. If the reader will glance back at
742, he will see what Currie thought of the rash use of his cold
ons, and what Dr. Gregory also states of the effects of cold.

en the body, instead of being hot, is cool—when a dingy and
ant capillary circulation shows a feeble and struggling heart, it
d be most dangerous to use cold. Here the warm or tepid bath or
ion should be used, or warm mustard foot-baths may be resorted
ery two or three hours. If, even whilst the body and limbs are
the head is hot, it would be proper to apply cold by cloths or affu-
to that part, whilst the body is immersed in warm water or wrapped
oper coverings.

e true guide as to the propriety or impropriety of using cold is,
can doubt now, to be found in the thermometer. The method fol-
d by Drs. Wilson Fox and H. Weber in the cases of hyperpyrexia
ring in the course of rheumatic fever is the one which we propose
e ourselves and to recommend to others. It is the only scientific
and therefore the one which can be accurately described and fol-
d. If errors occur, they can be definitely stated and afterwards
led. If successful, the exact means which led to success can be
tained and communicated in precise language. Dr. Fox published
ases first in the London *Lancet*, and then presented them in a sep-
form as an essay, "On the Treatment of Hyperpyrexia, as Illus-
d in Acute Articular Rheumatism, by Means of the External Ap-
tion of Cold;" Macmillan & Co., London, 1871. Dr. H. Weber's
is to be found in the *Transactions of the Clinical Society of London*,
v, p. 136, under the title of "A Case of Hyperpyrexia (Heat-
e) in Rheumatic Fever Successfully Treated by Cool Baths and
sions."

e first point to be determined is the degree of temperature which
mes dangerous to life, and to prevent or reduce which we may and
t to resort to the application of cold externally. Of course there
t one certain guide to the temperature of the human body,—the
mometer. A practised hand may be relied on when no thermom-
is to be had; but no hand, however experienced, can give the cer-
y of the thermometer. Inasmuch, too, as the state of hyperpyrexia
ays attended by concomitant phenomena of a peculiar kind, these,
e experienced physician, will assist in guiding him in his treatment.

been reached. He, however, saved one patient, by
whom it reached 110° in the rectum. Dr. H. Weber
the cold treatment was used, a temperature of 108°
always fatal. Dr. Fox asks the question, After what
perature attained by the human body in febrile states
urally possible without medical interference? He
highest recorded temperature he knows of after whi
taken place (with the exception of relapsing fever), wa
bercular pneumonia, in which it rose suddenly from
then suddenly fell to 104°. He refers, of course, to
by cold, since, as stated above, he himself saved a
temperature had reached 110° in the rectum.

It must not be forgotten that the axillary tempera
that of the mouth, under the tongue, and that this is
the vagina or unloaded rectum. Wunderlich gives the
adult as follows: For the axilla, 98.6° F.; for the
98.96°; and that of the vagina or unloaded rectum,
In children the temperature is more variable, but doe
greatly from that of the adult. M. Roger gives 98.97
axillary temperature between 4 months and 6 years, an
6 and 14 years. Dr. Finlayson, in 21 children under 6
morning temperature in the rectum to be 99.41° F.

Such being the normal temperatures, we will now
have been observed in scarlet fever. Wunderlich (
Syd. Soc. ed., p. 348) says that the height reached by
in scarlet fever is almost always above 104° F., very
104.9°, while in cases which terminate favorably it
105.8° F. The translator of Wunderlich (Dr. Wood
221) gives the noon temperature of typical non-maligna
good many cases as 105°, 104°, 103°, and 102°, on the

nt it tends to rise above this point, the patient enters into a very rous period.

with a temperature of 105°, there appear any of the nervous phena so often alluded to, delirium, drowsiness, coma, vomiting or ng, and especially any locomotor disturbances, the time has come e use of external cold; and should the temperature continue to rise it has reached 105°, the cold treatment ought to be resorted to, though these nervous phenomena have not shown themselves, they will be almost certain to appear should the temperature go ing.

d next as to the best mode of applying cold. It does not matter how this is done, if only it be so managed as to reduce with cer- the heat of the body towards the normal point. Dr. Fox used at different temperatures, and in one case applied ice to the chest long the spine in an ice-bag, whilst he reduced the temperature bath rapidly from 96° to 66°. At other moments in the same case ed the ice-bag applied to the spine for several hours at a time, and ill other occasions employed the cold pack, wrapping his patient sheet wrung out of ordinary cold water (probably 60°). Dr. H. r placed his patient (a boy of 16) in a bath at 71° F., keeping him the first time thirty minutes, when the temperature under the e had fallen from 108.2° to 101.8°. Some hours afterwards, when emperature had risen to 105.8°, the patient was again put into h at 72°, and water poured over the back of the head and neck. enty-five minutes the temperature fell to 101°.

. Fox says, at page 34: "I believe, however, that the bath may ltogether dispensed with, and that for the future it will be suffici- to place a Mackintosh sheet under the patients, so arranged that vater may escape into a receptacle, and to pour cold water over from time to time."

. Corson uses affusions of cold water over the head of the child, h is held over a tub, as the most powerful means in cases of coma onvulsions, and, when the temperature is very high, washes the e body with iced water, or even rubs it with ice.

e most convenient mode, it appears to us, in children, will be r the one proposed by Dr. Fox, the Mackintosh sheet on the bed, affusions of cold water; or a bath-tub or common large wash-tub, aining water at a temperature proportioned to the heat of the , 80° to 70°, with affusions of cold water upon the head, or the ication of towels wrung out of cold or iced water to the head. So as the thermometer, held in the rectum or under the tongue, shows the temperature has fallen to 101° or 102°, it will be best to remove atient to bed between two blankets. Not unfrequently, as the temture falls, the patient becomes partially conscious, grows paler, and ers, and these are signs which show that it is time to cease, at least orarily, the use of the cold.

e physician, when he first uses this mode of treatment, should that the temperature is apt to continue to fall, even after the use these are constipated, the magnesia is to be used. In the con- case, or when the bowels are in a relaxed state, we use the soda The dose of either is five or ten grains, every two hours, accord- the age. They are best given in solution in water, with a little r syrup.

ere are a class of cases which, though they do not exhibit the ex- severity of those we have just considered, well deserve the name ave. The temperature is high, the pulse rapid, the nervous n shows disturbance by extreme agitation or by drowsiness; there be muscular starting, or tremors, or a single slight convulsion; uption is very abundant, and vivid or dark in tint, and the angi- symptoms are marked and severe. Such cases are dangerous; n last less than two or three weeks, and require all the care of the itioner and nurse.

this second grade of the grave form the temperature ought to be ed, using the thermometer as a guide, at the beginning by the al use of the cool or tepid bath, or by cool or tepid ablutions, and e use of cold water or ice to the head. Internally the hyposul- salts or an alkaline febrifuge ought to be administered for the ew days.

e patient often, indeed generally, in this class of cases, sinks after days, into a low ataxic condition. Here the best remedies, we , are chlorate of potash with muriated tincture of iron, quinia muriated tincture of iron, or muriated tincture of iron with solu- f acetate of ammonia and dilute acetic acid. Hillier thinks that h cases the best medicine is carbonate of ammonia, and Trousseau dvises it strongly. These medicines may be given in the follow- odes:

.—Potass. Chlorat.,	ʒj.
Tr. Ferri Chlorid.,	fʒj.
Syrup. Zinziberis,	fʒvij.
Aquæ,	f℥ij.—M.

, a teaspoonful every two hours at five years of age, and under that age, half oonful.

.—Quiniæ Sulphat.,	gr. xij.
Tr. Ferri Chlorid.,	fʒj.
Syrup. Zinzib.,	fʒv.
Syrup. Simp.,	fʒij.
Aquæ,	f℥ij.—M.

, a teaspoonful every two hours at five years, and under that age, half the ty.

.—Tr. Ferri Chlorid.,	fʒj.
Acid. Acet. Dil.,	fʒj.
Liq. Ammon. Acetat.,	fʒvj.
Syrup. Simp.,	f℥ss.
Aquæ,	f℥iss.—M.

, a teaspoonful every two hours at five years of age, and under that age, half antity.

The dose of carbonate of ammonia is from two to three grains two hours at five years, given in a mixture of syrup and gum, or i and water.

In all severe cases attention to the diet is highly importan first only milk and broths should be allowed. After a few days or some other farinaceous substance may be added. Until the has disappeared in great measure, no other diet ought to be perm The cases are very uncertain in their course.

Under certain conditions alcohol must be used as has alread said. When the tongue is dry, the skin harsh, the pulse rapi feeble, the cardiac impulse weak, the muscular force prostrated, brandy or whisky, or wine in the form of wine-whey, or mixed water. The choice between these agents must depend on the deg vital, and especially of circulatory, prostration present, and the of the patient. We use brandy generally, giving it in milk or From ten to twenty drops at the age of one or two years ; from t to forty drops between two and five years of age; and after thes from half a teaspoonful to a teaspoonful every two or four hou three or four times a day, according to the effects produced up pulse and nervous symptoms, are the doses we have found best. wine-whey is preferred, one or two teaspoonfuls every hour o hours, at two years of age, and a tablespoonful at the age of fo five and upwards, may be given.

Treatment of the Angina.—The angina is seldom troublesome the third day. It never becomes, we think, a source of danger in in the cases destined to end fatally on the first, second, or thir But, when the case begins with grave nervous symptoms, an patient survives these, the throat almost always exhibits, on the or fourth day, the conditions which have already been describe which partake so much of the character of severe diphtheria. general treatment ought to be steadily persevered in—that by th posulphites, or by the muriated tincture of iron, with or without ate of potash and quinia, as has been described. The local trea should consist, in the early stage, of cold applications, if the con tional state of the patient will allow of it. When the circulation tive, and the temperature of the body high, there need be no fear the use of cold. When, on the contrary, the heat is not high, it s be used with caution, and, if the temperature falls rapidly under it it must be abandoned, or used only from time to time, and with care. When the temperature continues rather low, warm poultic closed in portions of thin, soft flannel, and secured by a light round the neck, may be tried. They may prove comforting patient.

When the cold is to be used, pieces of ice wrapped in flanne applied behind the angle of the jaw, or cloths wetted with iced may be employed. We have used the cold several times, a two cases with marked benefit. In one case, which we shall rela effects were most striking.

sE.—The patient was a boy between eight and nine years of age, who had had
t convulsive movements and delirium on the first day, violent jactitation and
nsciousness on the second and third days, with very active pulse, profuse dark
ion, and very high temperature. There appeared on the third day threatening
nose symptoms. On the fourth these had increased, and, by the night of the
day, had reached such a height as to make us almost despair of the child's life.
violent pharyngeal inflammation was attended with excessive swelling of the
ils, and with œdematous infiltration of the submucous tissue, while externally
ervical glands were enormously enlarged and as hard as paving-stones, and the
ntaneous tissues of the front and lateral regions of the neck were packed and
with acute œdema. The general symptoms were most threatening. Owing to
welling of all the parts composing the neck, the respiration was so much inter-
l with as to cause the development of dangerous asphyctic symptoms. The
e, which for the three first days had been running at 168, had fallen on the
th to 140, and on the fifth to 128; the skin was hot and dry, and, upon the face,
ssumed a dark, bluish tint; there was almost constant muttering delirium and
gree of tossing and violent jactitation painful to witness. The swallowing was
uch impeded that it was with great difficulty that the patient could take the
nest liquids. Up to this time the case had been treated with inunctions, cold
ks, and a febrifuge containing spirit of Mindererus and sweet spirit of nitre. In
nidst of these threatening symptoms, and when we had almost lost hope, the late
Charles D. Meigs, who saw the case with us, proposed abandoning all drugs, and
ng use of cold applications externally, and giving stimuli. Accordingly a large
was wrung out of iced water and wrapped around the neck, and weak wine
water was given as often as the child could take it. The cloth was dipped afresh
the water every few minutes. This treatment was commenced about 1 A.M.,
arried on steadily all night. At 9 A.M., it was evident that the symptoms had
what improved, and by the afternoon of that day the patient was greatly better.
mprovement consisted principally in a moderation of the pharyngeal swelling,
at both respiration and deglutition were much easier. The dark color of the face
essened; the pulse had risen in frequency, and was stronger; and the delirium
xcessive jactitation had almost disappeared. On the day after this the external
cal swelling continued very much the same, except that the œdema had notably
nished. The pharyngeal swelling had disappeared, the tonsils having regained
natural size, but the whole pharynx was covered with a thick mould of white
ation. The cold application, which of late had been used more sparingly, was
discontinued; the fauces were touched with a solution of nitrate of silver of
rains to the ounce; broths, milk, wine-whey, and wine and water were given
ourishment, and the patient slowly recovered, after having had a large suppu-
n just above the inner end of the left clavicle.

was at one time very much the custom to make various applica-
s to the fauces. Nitrate of silver, pure, or in strong solution, muri-
acid, or capsicum, were deemed necessary and useful. They have
very much abandoned, and we think wisely. The agitation and
or caused by them in some children, and the violent resistance they
n make, exhaust the patient, and we therefore avoid them wherever
an. Sometimes, however, and especially in young children, viscous
etions collect in the fauces in such quantity as to cause serious annoy-
to the child and embarrass the respiration: they ought, therefore, to
emoved by means of a sponge-mop or camel's-hair brush. This point
e treatment is a very important one, especially in young children.
believe that we have rescued more than one patient by going three
ur times a day to make use ourselves of means by which to remove

from the fauces, the viscid, glue-like secretions, the purulent flu
the masses of pseudo-membranous exudation which collect in
clude those passages, and which the child often cannot, by any
its own, get rid of. The best mode of effecting this object is by
of mops, made of sponge or rag, fastened to a stick or whaleb
by the injection from a small syringe or elastic bottle of de
washes or gargles into the throat, the mouth being held open
tongue depressed by the handle of a spoon. One of the best
for this purpose is made of a strong decoction of green tea con
alum; or we may employ sage tea and alum; or honey of ro
borax mixed with water; or lime-water; or, what is highly
mended by Dr. Watson as one of the best, a solution of comm
Muriated tincture of iron, one part to five or six of water, or to
glycerin and five of water, is an excellent local application. In
children, gargles of salt and water, alum and water, chlorate of
in claret and water, or plain water, may, and ought to be used
possible. When coryza is present, the nasal passages should be c
by means of camel's-hair brushes, or by the injection of some
mild washes just referred to, and then freely anointed with swee
some mild ointment, or they may be touched with the wash u
the throat.

Diarrhœa, when present, probably depends on congestion and
mation of the intestinal mucous membrane, and should be treate
bland demulcent drinks, and absorbent antacids, especially cha
ture.

Rheumatism should be treated by opiates to allay the pain, a
swollen joints should be enveloped in bats of cotton. If supp
should occur, either in connection with the rheumatic inflamma
the joints, or involving the glands or cellular tissue, and indic
pyæmic tendency, large doses of quinia with stimulants sho
given. The abscesses which may form should be opened so s
fluctuation can be detected.

For the *otorrhœa* which sometimes occurs, it is seldom neces
do more during the violence of the attack, than to cleanse th
twice or three times a day, by syringing with warm water and
soap, or with a weak solution of alum. After the violence of the
has subsided, this complication should be treated as in idiopathic

Treatment of Dropsy.—It is our habit, when directing the g
treatment of a case of scarlet fever, always to explain to the mot
nurse, or both, that the most frequent and dangerous sequel to be
hended in this disease is dropsy, that this is even more apt to
mild than grave cases, and that it usually occurs in the third or
week of the disorder, though it does occur, on very rare occasi
a still later period. We also assert our belief that this conseque
complication, or sequela, is apt to be produced by cold, and tha
jects confined to bed through the third and fourth weeks, and
rigidly secluded in a warm room for four weeks from the onset
disease, no matter how mild the case, are much less prone to

they who leave their beds or rooms at an early period to take sual chances to which children are exposed. We know well that ra ridicules the stupidity of English physicians in ascribing so y disorders to cold. But, whilst we believe with him that in England amongst ourselves the word "cold" is often used both by ical men and by the public as a mere scapegoat to bear the weight heir ignorance of the real causes of diseases, we also believe, most hatically, that chilling of the human body below its natural standof heat, if it be continued for any length of time, is very apt to be wed by some disturbance of the health. We are quite sure that have on several occasions, traced a relation of cause and effect been exposure to cold in the third or fourth week of scarlet fever a rapidly sequent dropsy. Several such cases are mentioned in the ion on the symptoms and causes of dropsy, at page 722. We always, efore, urge upon the mother or nurse not to allow the child, in the mn, winter, or spring months, no matter how mild may have been disease, to leave a well-warmed and well-ventilated room for four ks, and, if there be any signs whatever of ailing health at the end e fourth week, to continue the seclusion for one or two more weeks.

of the troubles of our private medical career has been the contens we have had with people in their hurry to get children, who have sick, out of the nursery. In summer weather, this may be all well, but in the cool and cold months it is not very well, as the of mortality and the experience of any older physician or experid mother, will show. Why a child should lie abed for two or three ths for a broken bone, without fear for his general health, and yet egarded as a suffering martyr, because some tyrannical doctor inupon his remaining a few more days or weeks in a comfortable mber, with all the household at his feet, to escape a disease like e Bright's disease, passes our comprehension.

efore leaving this subject, we wish to say that we have known sy to follow scarlet fever in one case, and only in one, in which child had not left the bed. Two children, brother and sister, seven nine years of age respectively, had each a full attack of scarlet r,—the boy rather a severe one. At the end of the third week the being perfectly well, was allowed to leave the bed in a warm room. wo days he was seized with scanty, albuminous urine and moderate psy. The girl, who had fallen sick several days after the boy, and was small and delicate, was kept in bed continuously, and yet she was attacked with dropsy. Both these cases proved very obstinate, it was several months before they were recovered.

is important to recognize the renal disease early. The mother uld be warned to send for the physician again, if he have resigned charge of the case, should there be any delay or irregularity in the valescence, and especially should she observe any unusual scantiin the quantity of urine discharged; should this assume a dark especially a brownish or blackish tint; should there be any fulness of the eyelids, swelling of the cervical glands, or, indeed, parture from a regularly progressive return to health.

In all cases of scarlatinous dropsy, the patient ought to to bed at once, and kept there throughout the acute period disease. The diet should be restricted to fluids. Milk and broths or farinaceous preparations alone ought to be allowed. patient should be encouraged to drink freely and often of lemonade, or orangeade, or sweet spirit of nitre and water. bath, used once or twice a day, is, we think, an excellent re in the early stage. It is best used in the following mode: A po bath-tub should be brought into the bedroom, if possible. Thi always be done in the cases of young children. The water ought warm—96° to 98° or 100°. The patient ought to be fully imm and kept in the water from ten to thirty minutes, the time being lated by the degree of willingness of the child to remain, and effect of the bath on the system at large, as shown by the counte and circulation. A soft cotton sheet is to be heated at the fire, this, when the patient is removed from the bath, he is to be car wrapped. Over this is to be put a light blanket, and thus wrapped two coverings, the child is to be laid in bed, or held in the arms, fo an hour or an hour. By this procedure sweating is generally ind When this is over, the sheet and blanket may be removed an child dressed in warm bedclothes again. The bath, carefully us this way, once a day in slight cases, and twice or even three in severe ones, has proved in our hands a most useful and soo remedy.

In mild cases, without fever, the bowels ought to be kept solub medicine being needed if they are moved spontaneously. If the not, a little syrup of rhubarb or Rochelle salts will be all-sufficien the amount of urine is scanty, a diuretic ought to be used. The f ing combination is excellent:

℞.—Potass. Bitart., ...	℥j.
Spts. Junip. Comp., ...	f℥ij.
Spts. Æther. Nitros., ...	f℥j.
Syrup. Simp., ...	f℥v.
Aq. Fluvial., ...	f℥ij.—

Give a teaspoonful every two hours.

In more severe cases, when vomiting, fever, anorexia, restles rapid anasarca, scanty and dark-colored urine with blood, bloo granular casts, and a large proportion of albumen, all demonstr serious and extensive catarrh of the renal tubules, it is proper dry cupping to the loins, or in subjects of vigorous constitution, jured by the previous scarlet fever, we may take three or four of blood from the loins by wet cups. If the cupping cannot be hot cataplasms of Indian mush or flaxseed or bags of hot sand be applied from time to time over the loins. The bowels ought

ot open by rhubarb, Rochelle salts, or Seidlitz powder. A febrifuge
d diuretic, such as the following, must be used:

℞.—Potass. Acetat.,	ʒj.
Tinct. Digitalis,	fʒss.
Syrup. Scillæ,	fʒj vel fʒij.
" Zingib.,	fʒv.
Aquæ,	ad f℥iij.—M.

Give a teaspoonful every two or three hours to children two or three years old.
r those above that age the proportion of the active ingredients should be doubled.

By these means the case should be treated for several days, until the
er subsides and the patient is no longer in present danger. When
fever is over, it is best to continue the above mixture, or something
the same kind, at longer intervals, and to give also one of the prep-
tions of iron. Our own favorite is the mixture of muriated tincture
iron with acetic acid and spirit of Mindererus, or the simple tinc-
e itself, in doses of from two and a half to five drops, according to
age, three or four times a day. If from any cause the tincture can-
be taken, wine of iron, or ferrated elixir of Calisaya bark, may be
stituted, in half-drachm or drachm doses.

s the fever disappears, the food ought to be increased. This is, of
rse, more important than drugs, and ought to be strictly attended
by the physician himself at each visit. In some instances the most
verse irritability of the stomach attends the case for several days,
that the patient may almost or actually die of exhaustion. In such
es it is worse than folly to give drugs which are resisted with loath-
, and vomited the instant they enter the stomach. Something must
chosen which at least does not clearly cause vomiting by its smell
taste. A mixture of wine of iron with syrup of tolu and some aro-
tic water, chocolate and iron lozenges, or powdered metallic iron
h white sugar, can often be taken even in these cases. A weak
am of tartar lemonade, flavored with lemon-juice, sweet spirit of
re in lemonade, watermelon-seed tea, and such remedies may be
d. In regard to details, as to the best method of feeding in such
es—on which, we desire to say, much more depends than upon
gs—we must refer the reader to the remarks on diet in obstinate
k stomach in chronic diarrhœa, at page 414. We venture to hope
t we have seen lives saved in cases of this kind by constant atten-
n to little details of food and medicine, which must have been lost
any less constant care. In one instance the child was almost coma-
e, with total suppression of urine for five days, and the stomach so
table that no remedy scarcely could be borne. Finally, under small
es of watermelon-seed tea, given frequently, mustard foot-baths,
sters behind the ears, and feeding with lime-water, milk and brandy,
ne whey, chicken tea, and such preparations, the patient recovered.

PROPHYLACTIC TREATMENT.—It was formerly asserted that *belladonna*,
d by persons exposed to the contagion of scarlet fever, had the power
imparting perfect or nearly perfect immunity from its attack. The

ay be carried in fomites. It has been propagated also by inoculation ith the blood taken from a patient, and with serum obtained from the esicles which sometimes accompany the eruption.

The period of incubation is difficult to determine, but is usually stated s from five or six, to twenty days, or even longer. In the great maority of cases, however, the eruption appears in from twelve to fifteen days after exposure to the contagion, thus making the duration of the period of incubation from nine to twelve days. Thus, in 12 cases where we were able to determine with precision the interval between the exposure to contagion and the appearance of the rash, it was ten days in 1 case, eleven in 1, twelve in 3, thirteen in 5, fourteen in 1, and fifteen n 1. In 108 cases observed by M. Girard, of Marseilles (quoted in *Med. Times and Gaz.*, Aug. 21, 1869, p. 225), the eruption appeared as ate as the sixteenth day only in 3 cases; in all the others it was developed on the thirteenth or fourteenth day, never before the thirteenth, nd never after the sixteenth.

MM. Rilliet and Barthez conclude that measles are more frequent, ss contagious, and have longer incubative and prodromic stages than carlet fever.

The same authors are of opinion that variola is somewhat more rare, ther more contagious, and that its period of incubation and its proomic stage are a little shorter than those of measles.

Measles, like other contagious diseases, rarely occur a second time in e same individual.

Age.—We find by uniting Dr. Emerson's tables with some given by r. Condie (*Dis. of Child.*, note, p. 100), that the disease appears to be ost frequent between the age of one and two years, for while 395 aths occurred in the second year, only 468 occurred between two and e years of age. This does not agree, however, with our own expeence, since of 280 cases of the disease that have come under our own servation, in which the age was accurately recorded, only 36 occurred the second year, while 84 occurred between the end of the second d the end of the fifth year. This discrepancy depends probably, in rt at least, on the greater mortality of the disease during the earliest ars of life, which would of course give a larger number of deaths for ose attacked in the second, than for those in the third, fourth, and th years. The cases that have come under our own observation ocrred as follows. They are stated in their order of frequency. In e sixth year, 37; in the second, 36; in the seventh, 35; in the fifth, ; in the fourth, 30; in the eighth, 27; in the first, 19; in the ninth, ; and then in the eleventh, tenth, thirteenth, twelfth, and fifteenth.

Sex.—It appears to be more common in the male than in the female x. Of 290 cases that we have seen, in which the sex was noted, 156 curred in males, and 134 in females.

Fungous origin.—In 1862, Dr. Salisbury, of Ohio (*Amer. Jour. of Med. iences*, July and October, 1862), published two elaborate articles, in hich he attributed measles to the action of the fungus developed on amp, mouldy straw. He reported the results of numerous cases in wsiness as the eruptive point approaches. The fever is accompanied thirst, partial or complete anorexia, and generally by headache, ich is frontal, and often complained of by children old enough to give account of their sensations.

omiting occurs sometimes, but not as a general rule. The catar- l symptoms commence with, or may even precede the fever. They stitute the most characteristic early symptoms of the disease, and eed the only ones by which we are able to distinguish it with any tainty in the first stage. They consist of irritation and redness of the junctivæ, especially that of the eyelids, lachrymation, suffusion of the es, sensibility to light, stuffing of the nose, coryza, sneezing, slight eness of the throat, cough, some constriction of the thorax, and slight spnœa. The state of the eyes and nose are very important as signs the disease. The above symptoms are not always present in the ne degree, being very strongly marked in some instances, in others s so, and in some rare cases, absent. They are important, because re are few cases of ordinary cold in which they are present to the ne extent, or if so, the accompanying general symptoms are slight npared with those of measles. We have rarely known the faucial ection severe enough to elicit complaints, and never to produce dif- alty of deglutition. It consists generally only of slight redness of tonsils, soft palate, and pharynx, which is most strongly marked out the time that the eruption makes its appearance. The cough ally appears on the first day. Infrequent and slight at first, it be- mes more troublesome as the case progresses, until it assumes, on the rd or fourth day, a character which is peculiar, and which may often d to a suspicion as to the true nature of the attack. It is laryngeal, rd, dry, rather hoarse, and occurs generally in short paroxysms. pectoration, if present at all, is slight, and consists of a clear, viscid cus. At the same time the voice is often hoarse.

The tongue is usually white and somewhat furred; the bowels re- in in their natural condition, or there may be slight constipation or rrhœa. Constipation is most frequent, according to our own expe- nce. The drowsiness, to which we have already alluded, often ex- s during the first stage. We have noticed it in a great many cases. e child, if undisturbed, sleeps quietly for many hours, or for the eater part of one or two days, waking only from time to time to ask drink, and then sinking off to sleep again. So common is this symp- n that old nurses have a saying,—"The child is sleeping for the asles." The symptom is not alarming, unless it be connected with hers which indicate local disease, or unless it pass into coma, or al- rnate with marked delirium. Other nervous symptoms which some- nes occur, especially when the fever is violent, are restlessness, itability, occasionally delirium at night, and, in very rare cases, con- lsions. Of 167 cases observed by Rilliet and Barthez, the latter symp- m appeared in the first stage only in one, and was then confined to e eyeballs. We have met with convulsions in 5 out of 314 cases, at e beginning of the eruption, and in one, of which we shall not now

the nervous symptoms in great measure disappeared
fifth, and sixth days, the fever returned, and on the
day, a full measles rash made its appearance. There
of the nervous symptoms, and the case ended favor
case occurred in a boy between seven and eight yea
and impressible temperament. The convulsive seizu
as the rash was coming out; it was very slight, and
than one or two minutes. In the fourth case, in a
year of life, who had already had three convulsive
causes, showing thereby a manifest predisposition to
order, the convulsions occurred as in the previous cas
ing out of the eruption. In this case also the convul
lasting only a few minutes. In neither of these tw
convulsions followed by dangerous symptoms. In
case, the convulsions, as in the two preceding examp
as the rash was appearing; they were very slight, a
by no serious consequences. The subject of this case
seven and eight years old, who had previously had a
sions produced by a severe febrile reaction occasioned
and another attack, caused by indigestion.

MM. Guersant and Blache (*Dict. de Méd.*, t. 27, p. 658
initial symptom, which has sometimes enabled then
approach of measles before the eruption. This is a
rose-colored punctation, of the roof of the mouth,
uvula, differing from that of scarlatina. We have ob
tom ourselves in quite a number of cases, and, as it
appears twenty-four hours before the cutaneous erup
we think that it is of some value as a sign in the earl

M. Girard (*loc. cit.*) states that the early diagnosis
the fact, that a red papule appears near the free bo

and two years old, the eruption, owing no doubt to the presence of
ere general bronchitis, did not make its appearance until the ninth
of the sickness, and even then came out slowly and with much dif-
lty. The disease was known to be approaching from the fact that
ther child in the house had just recovered from an attack. In another
, in a girl between twelve and thirteen years of age, the eruption
an on the fourth day of the sickness, but was so faint and indistinct
we could not, until the sixth day, feel sure that it was a measles
. Even after this, the eruption continued pale and insufficient until
seventh day of the eruption, when it was out fully and completely.

econd Stage, or that of Eruption.—The eruption generally appears
e time in the course of the fourth day, showing itself first on the
or cheeks, or some other part of the face, and extending gradually
he neck and trunk, and finally to the extremities. It is often com-
ed in from twenty-four to forty-eight hours. It begins in the form
istinct spots, not unlike flea-bites, of a more or less bright rose or
son color, verging sometimes towards a deep red, of a roundish
e, with irregular edges, and of different sizes, varying between half
e and three lines in diameter. When fully formed they constitute
papules, which are felt to be slightly elevated and firm to the touch,
broad, flat summits. When pressed upon, their color disappears, to
rn rapidly when the pressure is removed. Distinct and scanty at
, the spots or stigmata soon become more numerous, and arrange
nselves into clusters of an irregularly crescentic or semilunar shape.
number of these clusters and the consequent general tint of the
, depend upon the amount and intensity of the eruption. In very
l cases, or when the eruption is imperfect, the clusters of papules
few in number, and they are separated by large portions of healthy
. In severe cases, on the contrary, the patches are so numerous,
coalesce so closely, that the skin assumes a general deep-red tint.
asionally in these severe cases minute vesicles form on the summit
he papules. Yet it ought to be remarked that it can be observed on
e examination that the papules never run completely into each other,
s to form a continuous red surface, unless it be over very small spaces
on certain parts of the surface, more particularly the face.

he fever does not diminish when the eruption makes its appearance,
it sometimes augments, so that the highest temperature of the
ck is usually attained soon after its full development. The skin
ins its heat; the irritation of the eyes continues and is sometimes
severe; the nostrils are dry and incrusted, or there is coryza, and
ome few cases epistaxis. The face is at the same time flushed, in-
endently of the eruption, the red color of the skin being observable
he intervals between the papules, and it looks swelled and turgid,
a tumefaction of the cheeks and particularly of the eyelids. The
gh continues, and is loud, hoarse, and frequent in most cases, but in
rs short, scarcely hoarse, and but slightly marked. The voice is
lly but not always a little hoarse. The respiration is slightly
kened in regular cases, but generally very little beyond the natural

Temperature.—According to the observations of Ringer (*Reynolds's*
t. of Med., vol. i, art. Measles), the highest temperature reached in
inary cases is about 103° F. From the observations of Roger (*op.*
p. 298) this would appear higher than is usually attained, the mean
is records having been only 101.5° F. If it rises above 102.5° it indi-
es a severe, if it continues below this, a mild, attack. The tempera-
e presents the diurnal variations usual in fevers, until the close of
disease, when it suddenly declines. The duration of measles,
asured by the temperature, varies considerably; the decline of the
er occurring in some cases on the fourth day, in others not until the
hth or tenth day.

RREGULARITIES OF THE DISEASE.—Under this term we shall describe
y the anomalous symptoms of the disease, which occur independ-
ly of complications. Those which are produced by the latter causes
l be fully treated of when we come to consider the subject of the
nplications.

n some cases, the symptoms of the prodromic stage are so slight that
y pass almost unobserved, and the child is scarcely thought to be
k until the rash makes its appearance. In others, owing to some
uliarity of the temperament, or to the state of the constitution at the
e, they are much more severe than usual, or some one symptom may
in excess. In one case that came under our own observation, in a
l seven years old, the nausea and vomiting were very distressing,
d were accompanied by the most intense frontal headache. She com-
ined precisely as children generally do with tubercular meningitis,
d was, moreover, extremely restless, and at night delirious. Never-
less, the eruption came out on the fourth day, and was perfectly
ular in its characters and course; the unpleasant symptoms ceased
m that moment, and the patient recovered without any further bad
nptoms. We have already spoken of five cases accompanied by
neral convulsions at the commencement of the first stage. The course
the disease in the subsequent stages was regular in all respects. In
o other cases, in girls, sisters, seven and nine years old respectively,
highly nervous temperament, the headache in the first stage was so
ense as to require the application of leeches for its relief; yet the
ease was regular in its other characters.

The eruption presents various irregularities which ought to be noticed.
has already been stated that the amount of the rash varies according
the severity of the case, although in other respects regular. Some-
nes the papules are comparatively small in size and few in number,
d consequently, the clusters in which they are arranged have con-
lerable spaces of healthy skin between. When this is the case, the
gmata are usually rough, lighter in color, and from this circumstance
d the fact that the spaces between the clusters are large, the general
t of the skin is much less deep than in severer cases, in which the
posite of these characters prevails. In some of the mildest cases, the
ount of eruption upon the extremities has been very small, and after
rming, it has very rapidly, in the space of a night, faded to such a

e exhibited by the patient, all serve to convince us that they cannot attacks of true measles. We recollect three such cases in particu- which, had they been accompanied by cough and fever, we should tainly have called measles. They all occurred in infants. The rash s preceded for two or three days by feverishness, uneasiness, rest- sness during sleep, and slight diarrhœa, after which the eruption denly made its appearance and covered the whole integument hin twenty-four hours. There were no catarrhal symptoms what- r. At the same time the febrile symptoms disappeared, and the ldren seemed quite well. The eruption never lasted over forty- ht hours, and disappeared without leaving a trace behind. They re, no doubt, cases of roseola.

Rubeola Maligna.—This form may occur either as an epidemic or radic affection. Generally, however, it prevails as an epidemic, and ends upon some peculiarity which it is impossible to understand. e few sporadic cases which are met with, may be traced generally some vicious state of the constitution of the individual, or to the avorable hygienic conditions in which he is placed. The symp- ns assume ataxic or adynamic characters, which give to the case features of the typhoid type of disease. They may make their ap- arance in the prodromic, or, as happens more frequently, not before eruptive stage. When they begin in the first stage, the case is rked by great frequency and feebleness of the pulse; by prostra- n; by unusual dyspnœa and oppression; and especially by greater lence of the nervous symptoms, as delirium or stupor. Sometimes, en in this stage, petechiæ make their appearance, and there is lividity d soreness of the fauces, with discharges of dark blood from the nos- ls, and sometimes profuse and exhausting diarrhœa or dysenteric charges. When the time for the eruption to appear arrives, this nes out slowly and imperfectly, or irregularly, and generally assumes livid, purplish, or blackish color, owing to the passive exudation of ood into the papules, and hence the name sometimes given to such ses, of *Rubeola Nigra*, or *black measles*.

This form of the disease assumes, in fact, many of the features of rpura hemorrhagica. The patient may die of exhaustion, of conges- n of some important organ, as the brain or lungs, of the diarrhœa or sentery which sometimes complicate the disease, or finally of the morrhages which occur in consequence of the dissolved and fluid state the blood; or he may, after a severe struggle with the disease, re- ver his health.

Complications and Sequelæ.—MM. Rilliet and Barthez begin their apter on the complications of this disease with the following excellent marks: "Rubeola manifests itself by an inflammation or inflamma- ry fluxion upon the skin and mucous membranes. The regular course the disease depends upon the conservation of a due equilibrium be- een these two kinds of fluxions. That which is seated in the skin ght in general to predominate: if the equilibrium be destroyed by y cause whatever, whether accidental or inherent to the disease, and should the predominance of the inflammation take place in the mucous membranes, there will result a phlegmasia of some one of those tissues.

"It is easy to foresee, by attention to these circumstances, that the inflammatory complications of measles will be most apt to fall upon the mucous membranes, and that broncho-pneumonia, pharyngo-laryngitis, and intestinal inflammations will be the most frequent of all."

Bronchitis and Pneumonia.—These constitute by far the most frequent and important complications of measles. In 167 cases, MM. Rilliet and Barthez met with 24 cases of bronchitis, 7 of pneumonia without bronchitis, and 58 of lobular broncho-pneumonia. This statement shows how very large a proportion of the cases of measles occurring in the Children's Hospital at Paris, became complicated in the course of the attack. The proportion in private practice is much smaller, since in 314 cases, we have met with only 24 of bronchitis, and 6 of lobar pneumonia. These are, however, in private practice, according to our experience, much the most important of the complications likely to occur. Of six deaths which occurred in the 314 cases that we have seen, 3 were caused by bronchitis.

The time at which these different complications make their appearance is important. They may occur during the initial stage, early in the eruptive stage, during the decline of the eruption, or after the eruption. The most common period for their occurrence is the initial stage. It is difficult or impossible to ascertain their causes in a great many cases. In some instances they depend evidently upon cold. Age has some influence upon their production, as bronchitis is most apt to occur in young children, whilst lobar pneumonia attacks those who are older.

The *physical signs* of these affections are the same as when they exist in the idiopathic form. The rational signs are increase of cough, which, instead of being merely laryngeal, becomes deeper and either pneumonic or catarrhal; and dyspnœa, which is sometimes excessive, the number of respirations mounting to 40, 50, and, in severe cases, to 60 and 80. The pulse is more frequent than in regular measles, and in very bad cases becomes rapid and small; the skin is hot and dry; the face is pale and anxious in severe cases, in which the eruption does not appear; and the child is generally restless and irritable, with broken irregular sleep, or, in the most violent cases, it is dull and soporose. In two of the fatal cases that came under our observation, convulsions occurred. It should be remarked, however, that in one, the patient, a boy only nine months old, was laboring under an attack of hooping-cough, and that it was in one of the paroxysms of that malady that death took place. In the other case, that of a boy eighteen months old, the convulsions occurred first on the day of eruption, and then ceased, to recur again the third day afterwards. The bronchitis dated from before the appearance of the eruption, and was no doubt the cause of the convulsions and death.

When a pulmonary complication begins in the prodromic stage, it almost always modifies the eruption in some manner, either retarding or rendering it irregular or imperfect. When it dates from the second ge, it may cause a partial or complete retrocession of the eruption. have known the eruption to be retarded several days, so as not to ne out until the fifth, sixth, or even ninth. When the rash does apr, whether at the usual period or later, it is evidently with difficulty. s pale and scanty, or abundant on one part of the body, and scanty on ther, or it appears and disappears alternately. At length it either nes out fully, and the threatening symptoms pass away, or the erupn lasts the usual, or nearly the usual length of time, in its pale and perfect condition, and the child recovers slowly and gradually from complication, which has become the most important part of the kness; or, in fatal cases, the symptoms grow worse and worse, and child dies after a few days, or a longer time, according as the inmation assumes the acute or chronic type.

Whenever it is observed in a case of measles, that there is more drowess or irritability than usual, or that the pulse is more frequent or onger than it ought to be, it becomes important to ascertain carefully state of the respiration. If this be accelerated, the thorax ought be examined with strict attention, by auscultation and percussion, to cover whether there be not some pulmonic inflammation at work, ely to convert the disorder from a mild one, as it almost always is en uncomplicated, into one dangerous to life, which it will assuredly come, should any pulmonic complication be allowed to steal unawares on the patient.

The prognosis of the pulmonic complications of measles would apar to be very unfavorable in hospitals for children, since Rilliet and rthez state that scarcely one patient in four or five recovered. Of 30 cases that we have seen, we have already stated that 3 died of nchitis, and if we recollect that one of these was complicated also th pertussis and morbid dentition, it will be seen that the prognosis as might be expected, vastly more favorable in private than in hosal practice.

There is, however, a tendency, especially marked in delicate, strus children, for the inflammation of the bronchial mucous membrane become chronic, in which case the cough may persist for years, at es intermitting, but returning after the slightest exposure, and parularly in cold, damp seasons of the year.

Laryngitis is a common complication of the disease. The authors st quoted met with it in 35 of their 167 cases. It occurred in 8 of e 314 cases that came under our observation. It is often accompaed by pharyngitis.

Autopsies show that the laryngitis may be slight, severe, or accomnied with pseudo-membranous exudation. The inflammation may simple, consisting merely of different degrees of redness, or of redss with thickening and softening of the mucous membrane; it may more intense and accompanied by ulcerations or erosions; or, lastly, may be associated with an exudation of false membrane.

The symptoms of this complication will depend upon the form the lammation assumes. It is unnecessary to describe them here, as they are the same as those of the idiopathic affection, which has already been fully treated of.

The occurrence of laryngitis exerts but little influence on the rash, particularly as it almost always appears during the decline of the latter. It is seldom fatal, unless it assume the pseudo-membranous form. The eight cases that came under our observation were attacks of the simple disease, and they all recovered.

Inflammation of the Intestines.—According to Rilliet and Barthez, lesions of the intestinal mucous membrane are the most frequent complications, after pulmonary affections. About a third of their cases presented at the autopsy erythematous inflammation of the mucous membrane; a fifth offered follicular entero-colitis, a seventh ulcerative inflammation, and a fourth softening. Some presented several of the lesions united, and in a few no lesion was found, though the symptoms of entero-colitis had existed during life. We give these data from the above authors, not because they apply to private practice, but merely in order to show what are the tendencies of the disease, when disposed from unfavorable hygienic conditions to take on complications. We have met with only seven instances of intestinal inflammation in the 314 cases that have come under our own observation. Four of these occurred in the same family, in children of seven, five, three, and one year old respectively. They were cases of entero-colitis, accompanied in two, with dysenteric symptoms, and all made their appearance towards the close of the disease. The three remaining cases were attacks of dysentery, one of which was very severe, the stools amounting to twenty in the day, while the other two were much less so.

The intestinal complications may appear during the initial stage, or on the day of eruption, but if not at one of these periods, they are most apt to occur during the decline of the rash. The slight cases, constituting the common diarrhœa of the disease, generally begin early, whilst the grave cases usually date from a later period of the disease. The *causes* of these complications seem to be various exciting agents acting upon a mucous membrane predisposed, by the nature of the disease, to inflammatory action. These agents are said to be, generally, improper food, giving rise to indigestions; and the too early use of purgative remedies, and laxatives. In the cases observed by ourselves it was impossible to detect the causes.

The *symptoms* are more or less abundant diarrhœa, and in some, but not all the cases, sensibility with tumidity and tension of the abdomen. This complication does not exert much influence upon the measles, which usually pursue their regular course. Sometimes, however, it occasions an aggravation of the febrile symptoms, and, when of a grave character, may no doubt interfere with the regular progress of the eruptive disease.

According to Rilliet and Barthez, this complication was very seldom the only, or even chief cause of a fatal termination. Scarcely five or six of all that they observed could be considered as of that kind. It increases very much, however, the danger of the pulmonic attacks,

he latter are much less serious, so long as they exist alone, while
oon as intestinal inflammation is added to them, they become almost
ssarily fatal. The seven cases that we met with recovered under
ple treatment.

a considerable number of cases, a slight diarrhœa, to which we have
ady referred as a common event in measles, occurred, but only in
seven above mentioned did it amount to a serious complication.

n one case that came under our observation, in a girl between five
six years old, fatal cerebral symptoms, due either to congestion of
brain or uræmia, occurred just as the rash was disappearing. There
no evident cause whatever for this accident. There had been no
rudence either as to diet or exposure. The child was, however, of
bercular family, the mother having at this very time tubercular
ase of the lungs. The eruption had come out well and properly,
continued to do so on the second day without any irregular or
atening symptoms. On the third day of the eruption this began to
line, and the child had an attack of spontaneous vomiting, but con-
ed through the day cheerful and pleasant. The night of that day
was restless and feverish, and wanted much drink. On the fourth
she was drowsy and heavy, and complained of her head. We saw
first in the evening of this day. She was then very dull and heavy,
cely answering questions, and protruding the tongue slowly and
r much urging. She had some little, but not a troublesome cough.
eful examination revealed no disease of the thoracic organs. The
iration was natural, and the pulse full and very frequent. On the
rning of the fifth day the patient was comatose, neither answering
stions nor protruding her tongue. In the course of the day there
e some irregular convulsive movements. In the evening the right
was rigidly flexed at the elbow, and the left one stiffly extended.
patient died that night.

n another case death occurred from sudden *effusion of serum* into the
rnal cavities, caused apparently by the existence of an excessively
ræmic state of the blood, possibly connected with albuminuria,
ich had been allowed to come on gradually, without any attempt on
part of the parents to seek a remedy during the slow approach of
condition of the circulating fluid.

ASE. The patient was a boy in the second year of his age, who had a phthis-
mother. The attack of measles took place in the last week of January, 1852,
was regular, and not, according to the account of the parents, we not having
the child, at all severe or dangerous in any respect. After the attack was over,
ever, and though he was running about the house as before, he continued to look
e and more pale and sickly until the evening of February 25th, when suddenly
r 11 P.M., he was seized with fever, and became very restless. On the following
at 9 A.M., we saw him. He was then extremely pallid, and very drowsy and
y; the breathing was rapid and oppressed, the pulse very frequent, and the skin
and dry. He was evidently dropsical, as both the face and hands, and the feet
were puffed, smooth, and doughy. The bowels had not been opened the previous
t. In the evening the pulse was 170; the skin was still hot, and the breathing
rapid and much oppressed. There was scarcely any cough. The percussion was

the ribs. This was, however, evidently of an ancient date. I
flammation of the pleuræ, and none of the pericardium. Both
bercles, which were not very numerous, but in the upper lobes
There was no pneumonia, but both lungs were somewhat conge
larger than usual. In the right auricle there was a rather larg
concretion, and a smaller one in the right ventricle. The left
concretions. The valves were healthy.

There are several other disorders which sometin
follow measles, but as we have already given as m
subject as the limits of the work will allow, we shal
a simple enumeration of them. They are otitis, op
rhages, gangrene of the cheek or vulva, anasarca, a
bral symptoms. We will merely add that measles
many observers to have a special tendency to devel
ease in the system, and that it is necessary, therefor
showing any predisposition to that diathesis, or one
parents, with particular caution, both at the time o
during the convalescence. It is not uncommon for
joined with other eruptive diseases. We have known
scarlatina in two instances, and Dr. G. B. Wood has
case of the same nature. It may be associated likewi
with erysipelas; of the latter we have met with one i
mention here that of the whole 314 cases of measles
served, 257 were simple and 57 complicated. The co
as follows: bronchitis, 24; pneumonia, 6; laryngitis, s
dysentery, 7; pertussis, 7; scarlatina, 2; convulsions
of the disease, 5, and in the latter stage, 3; keratiti
fever, 1; erysipelas, 1; meningitis, 1; congestion of th
effusion into the internal cavities, 1. It ought to be o
that in the above enumeration several cases are refe
one, a case in which pertussis, bronchitis, and con

different organs, which are colored red from the imbibition of blood
d sometimes softened. The congestion affects the mucous membranes
rticularly, and imparts to them a reddish or slightly blackish color.
some of the cases there is morbid development of the intestinal fol-
les. The most important lesion, however, is that of the blood, which
esents the appearances common to the class of pyrexiæ. These are
rmal proportion or diminution of the fibrinous, with increase of the
obular element of the blood. Dr. Copland (*Dict. Prac. Med.*, vol. ii,
819) gives the appearances in a few fatal cases of malignant measles.
hey were, softening of the tissues and the facility with which they
ere torn; the presence, in some of the cases, of a turbid or sanguine-
us serous fluid in the serous cavities; general congestion of the lungs;
rk appearance, and livid or purple ecchymoses of the bronchial mu-
us surface, of the fauces, stomach, and cæcum; engorgement with
rk and semi-fluid blood of the veins and sinuses of the brain, and of
e auricles and large veins; and finally a livid and mottled appearance
some parts of the body, with petechiæ of a dark color.

DIAGNOSIS.—It is impossible to diagnosticate measles in the first
age with any considerable certainty. The existence of the disease
ay be suspected in that period from the appearance of the eyes, from
e coryza and sneezing, the frequent, hoarse, scraping cough, and the
ver, headache, and thirst. If, in connection with these symptoms, it
appens that an epidemic of measles be prevailing at the time, or that
e child has been exposed to the contagion of the disease, the inference
ecomes still more plausible. Nevertheless, any opinion upon this point
ught to be given with much reservation.

We have already alluded to the opinion of some authorities, that the
agnosis in the early stage is aided by the presence of punctated red-
ess of the roof of the mouth, or of a red papule on the velum palati.

After the eruption has come out fully, it is not likely to be mistaken
r any other disease, unless it be roseola, the rash of which sometimes
sembles that of measles very closely. It may be distinguished, how-
ver, by attention to the concomitant symptoms, by the slight degree
f fever, the more rapid evolution of the rash, and the absence of the
eculiar catarrhal symptoms in roseola. In the very early stage of the
ruption, measles may be confounded with variola. A careful attention,
owever, to the size and shape of the papules, which in measles are
uch larger, flatter, less elevated, softer, and without the shotty feel
eculiar to the papules in variola, and the presence of the catarrhal
ymptoms, will usually suffice to distinguish them, even in the earliest
tage. In measles also the general symptoms persist, or even become
ggravated after the appearance of the eruption, instead of abruptly
ubsiding as they do in variola. A little later, the appearance of vesi-
les on some of the papules about the face in variola, will show the
ifference still more strongly. The distinction between measles and
carlatina has already been drawn in the description of the latter dis-
ase. It rests chiefly on the much shorter duration of the prodromic
tage, the greater violence of the anginose symptoms, the absence of

wrists (Ringer), more frequently become petechial,
longer time.

When measles are conjoined with some other erupt
is to be made out by a careful study of the initial sym
eruption on different parts of the body, for we can ge
marked patches of the rash peculiar to each on som
surface. In one of the cases of measles and scarlatina
latter disease was developed first. The eruption ma
in the usual form; on the second day of the eruptic
seized with hard, hoarse, laryngeal cough, and wit
eyes and lachrymation. These symptoms continued
end of which time the scarlatinous rash had disappear
but remained visible upon the trunk and extremities
measly papules now made their appearance on the f
their regular course, while on the trunk and extrem
eruption was never well defined, being mixed with an
were, by that of the scarlatina. In the other case,
peared first and went on regularly until the eruption w
the general symptoms moderating, when suddenly t
skin, restlessness, and irritability returned, and the ch
covered with the punctated scarlet rash of scarlatina.

PROGNOSIS.—The prognosis of simple, uncomplicate
favorable; the cases almost always recover without d
shown to be true by the following facts: Rilliet and I
cases of simple measles, of which all but one recover
that we have seen, all terminated favorably. When,
complications occur, the disease always becomes mor
ous, the degree of danger depending on the nature of
affection, and on the hygienic conditions in which the
Thus of 131 cases observed by the above authors, in
of complication occurred, 89 or about two-thirds prov

ld nine months old, who was laboring under pertussis when attacked
h measles. Bronchitis supervened upon the measles, and proved
al by convulsions, which came on during a paroxysm of hooping-
gh, two weeks after the disappearance of the rubeola. The second
e was that of a boy, eighteen months old, who was prescribed for by
apothecary from behind his counter, until we saw him. The erup-
n made its appearance imperfectly, we were told, and with a con-
sion. After this he was very restless, and had rapid and difficult
piration and much cough. On the morning of the fourth day of the
ption, this had almost entirely disappeared, and the child was again
acked with convulsions. We saw him shortly after this for the first
ie, and found him comatose, with convulsive movements of the limbs,
reme dyspnœa, and all the symptoms of extensive bronchitis of both
gs. He died thirty-six hours from this, as was to be expected. The
rd was a case of pneumonia in a child between one and two years of
e, in which the inflammation came on as the eruption was fading,
d proved fatal, in spite of all that could be done, on the eleventh
y. The fourth occurred in a boy between four and five years old,
o appeared to recover perfectly from the measles, but was attacked
ten days with meningitis, and died. The fifth was the case of con-
tion of the brain, already detailed in the remarks upon complica-
ns, as proving fatal shortly after the decline of the rash. The sixth
s that of sudden dropsical effusion into the internal cavities, also de-
ibed in the remarks upon complications.

To conclude, we may state that the prognosis is always highly favor-
le under the following circumstances: when the disease is primary;
en the initial stage is of the proper duration; when the eruption
gins upon the face and extends gradually to the rest of the body;
en the febrile movement is moderate; when the eruption, after in-
easing for one, two, or three days, gradually decreases; when the
ugh and other concomitant symptoms diminish with the fever; when
e cutaneous surface, after the fading of the rash, assumes a natural
lor, and is neither flushed nor pale; when the appetite returns, the
position to be amused and take notice continues, and lastly when
e sleep is natural.

On the contrary, the prognosis becomes unfavorable under the fol-
wing circumstances: when the initial stage lasts longer than usual,
d when it is accompanied by violent symptoms of any kind, as ex-
eme jactitation, irritability, dyspnœa, much stupor, coma, or convul-
ns; when the eruption is irregular in its appearance or course; when
e fever does not disappear with the eruption, whether it remains vio-
t or assume the form of hectic; when, after the eruption, the face
tinues deeply flushed or becomes very pale; when the cough, dysp-
a, or diarrhœa persist; and, lastly, when the child remains weak,
guid, dispirited, or irritable.

t may be stated, in conclusion, that the prognosis of measles is al-
ys favorable in proportion to the health of the child at the time of
invasion, and the regularity with which the disease passes through

than usual.

The child ought to be confined as much as possible
well-ventilated chamber, the light in which should b
ened. Every precaution should be observed to preve
body, while at the same time it is nearly, if not quite
avoid overheating the patient, either by excessive clot
ing the temperature of the room too high. In winte
rect the temperature to be maintained at between 68°
and day. If this be done, the child is not apt to take
it be uncovered at times, and yet the warmth is not
have often remarked that this temperature is just wh
when the room is well ventilated, either by means of
or by communication with adjoining rooms; but w
trary, the room is heated by a furnace-flue, and not
or very imperfectly, the same temperature, as indica
mometer, becomes extremely close and oppressive.
cumstances, a door into an adjoining room, or if thi
into the entry, ought to be kept more or less open,
some kind between it and the child, in order to secure a
which is assuredly of the very highest importance, a
by the screen a current of cool air from chilling th
Florence Nightingale remarks that doors are made
windows to open. There is much in this saying, and
is intelligent and observant, we much prefer to shut t
a window. In our winter temperatures in this city t
very carefully. One of the sashes raised an inch, or o
will make a large difference in the temperature and v
of the sick-room.

The *diet* during the febrile period ought to be ver
consist of milk and water, of arrowroot, sago, or tapio

th a few drops of hydrochloric or nitric acids. They may be given any reasonable quantity, at the temperature of the room. Some rsons have a great dread of cold water in this disease. We have ver seen small quantities (a wineglassful or two at a time) of cold tter do any harm, and believe it to be most useful and necessary ien the fever is violent, and the heat very great. We once, however, w a boy, nine years old, attacked with violent colic and partial retrossion of the eruption, after swallowing suddenly a tumblerful of iced tter. The unpleasant symptoms passed off in a few hours, and he d no difficulty afterwards.

The patient should not be permitted to leave the room until a few ys after the entire disappearance of the disease. This precaution is cessary for all, but particularly for the delicate, and in the cold eather of these latitudes. He should be kept in the house until he s regained in some degree his usual health, and then sent out with e precautions.

Medical Treatment.—Many cases of measles—the mild, the moderate, e uncomplicated—need no other treatment than that just laid down the paragraph on the hygiene of the disease. So long as the case es on regularly, so long as the symptoms are moderate and such as cause but little suffering, there is no necessity for drugs, or, at the ost, a simple diaphoretic, as sweet spirit of nitre or the solution of etate of ammonia, with a little paregoric or laudanum once or twice the evening, will be all that ought to be done.

The child does not require, and therefore ought not be made to take a mere routine *cathartics*. If the bowels are known to be costive, and t to have been moved for two or three days, a teaspoonful or dessertoonful of castor oil, or, better still, a dessertspoonful to a tablespoonl of simple syrup of rhubarb, or a simple enema, will answer every urpose. We are sure that active purging is unnecessary, and apt to e hurtful.

When the case is a very decided one, and the eruption extensive and eep in color, the fever runs high, and the patient often suffers greatly om the fever-pains, and from the violence and frequency of the cough. ere medical treatment is necessary, since it lessens suffering, diminhes the violence of some of the symptoms, and so promotes the safety f the patient. In infants, under these conditions, we order five drops f sweet spirit of nitre, two or three of syrup of ipecacuanha, and two f paregoric, in a teaspoonful of sweetened water every two hours, at e age of six months. At one and two years, we double the proporons of the active ingredients. Should even these small doses of ipecuanha cause any sickness of stomach, we lay that drug aside. One the best combinations is the following:

℞.—Potass. Citrat.,	ʒj.
Spts. Ether. Nit.,	fʒij.
Tr. Opii Deodorat.,	♏xij vel xxiv.
Syrup. Simp.,	fʒvj.
Aquæ,	f℥ij.—M.

Dose.—A teaspoonful every two or three hours, at five years of age.

In younger children, from two to five years, the same formula may be used, except that the laudanum should be reduced to six minims. When the cough is very dry, scraping, and, as it sometimes is, incessant, there should be added to the above mixture syrup of ipecacuanha, in the proportion of five to ten drops to every teaspoonful, according to the age of the child; and there may and ought to be given from time to time, if the patient be not too drowsy from the effects of the fever or the mixture, an extra dose of opium. We prefer nearly always the deodorized laudanum. Of this from two to four drops in a teaspoonful of water may be given two or three times a day, or, better still, once or twice in the evening, to children over five years of age. From one to five years of age, one or two drops are enough. In some few children paregoric may answer better, but this rarely happens. When it is given, ten to twenty drops at five years, five or ten at one year, and from half a teaspoonful to a teaspoonful over five years, may be used instead of the laudanum.

Depletion, except that which comes of the above treatment, is unnecessary. We did, in past years, use depletion in 2 cases out of 257 regular cases of which we kept notes. In one, a venesection to four ounces was used in a boy seven years old, on account of the great violence of the febrile movement; and in the second, leeches were applied to the temples for an intense headache in a girl nine years old. For many years past we have used no general bleeding, but might be tempted to use leeches in a case of the same kind as that just mentioned, in which the pain in the head was something quite out of the usual way. Instead of venesection we should make use of a warm bath continued for fifteen to twenty minutes. If the temperature of the body be very high, it may be reduced by careful sponging with tepid or cool water.

Sometimes, when the cough is very troublesome, a mustard foot-bath used every three or four hours, and a mild liniment, as one composed of sweet oil and spirit of hartshorn, or of chloroform, camphor, and soap liniment, rubbed gently upon the front of the neck and over the upper part of the sternum, will assist materially in palliating this symptom.

When the conjunctival inflammation is acute and painful, it may be relieved by lotions with simple warm water, milk and water, or sassafras-pith mucilage, alone or mixed with rose-water. If the headache be very violent it can generally be relieved by the use of a laxative, by the occasional use of a mustard foot-bath, or of a sinapism to the nucha, and by the application of cold to the head.

If, at any time during the course of the case, symptoms of exhaustion appear, the most nourishing and concentrated food, with alcoholic stimulants in graduated doses, should be promptly resorted to.

The *malignant form* of the disease must be treated chiefly with stimulants and tonics. The most useful are wine and brandy, quinia, ammonia, capsicum, &c. Camphor and opium would be proper, were the case attended with severe nervous symptoms. The diet ought to be nutritious and digestible, and may consist of milk and bread, light broths, and beef tea or essence of beef.

When local inflammations occur, they may be treated by a few dry ps, or by means of counter-irritants, of which the most suitable are stard, spirit of turpentine, or ammonia. Blisters ought to be oided, as they are very apt to occasion dangerous and even fatal ughing.

TREATMENT OF THE COMPLICATIONS.—*Bronchitis, Pneumonia.*—The de of treatment of these complications must depend upon the stage which they are developed, and upon the age and constitution of the bject. When they occur during the first stage, one of the most im- rtant points in the treatment is to endeavor to favor the appearance the eruption, and when in the second stage, and the eruption has re- ceded wholly or in part, the same indication applies with equal force. hen they appear during the third stage, they are to be treated with- t any regard to the eruption, but always with reference to the fact at the patient has just passed through an acute febrile disease, which ust have weakened in some degree the vital powers.

It may be stated in general terms, that the treatment proper for ese local inflammations when they occur as primary affections, is oper also, with some reservations, under the circumstances we are w considering.

Thus even local depletion should be employed only with the greatest re, and, indeed, we should recommend in preference the application dry cups, or of sinapisms.

Purgatives should also be used with caution, on account of the dispo- tion to gastro-intestinal irritation which is always present in this dis- se. Our own practice is to employ moderate counter-irritation, in njunction with minute doses of sulphurated antimony and Dover's wder, or a mixture containing citrate of potash and syrup of ipecac- anha. When in these cases the skin is at all coolish, or bathed with o considerable a perspiration, we have found the liquor ammoniæ ace- tis a very useful remedy.

It is universally acknowledged that it is exceedingly important to sist nature in throwing out the rash, whenever these complications ther prevent its formation, or cause its retrocession. The true mode doing this is to cure or alleviate the internal inflammation, which is e cause of the difficulty. To attain this end the above plan of treat- ent ought to be instituted at once. At the same time, we may reatly assist the appearance of the eruption by a persevering employ- ent of counter-irritants. The best of these is, we believe, mustard, nd in some cases a warm bath. The mustard may be used in the form plasters, poultices, or baths. Our own plan in moderately severe ases, is to apply a mustard poultice to the interscapular space, and to ake use of a mustard foot-bath, two or three times a day, while in evere and urgent attacks we direct the cataplasm and bath to be re- ewed every two or three hours, taking care, however, to apply the rmer alternately to the front and back of the chest, in order to avoid ll possibility of too violent an action upon the skin; the feet and limbs lso ought to be carefully watched, to avoid the same danger. We have ad occasion to observe the great efficacy of this unremitting employment of revulsives, in several severe cases of bronchitis in young children. In some we have depended solely upon this treatment, and the use of small doses of ipecacuanha and spiritus Mindereri. In one particularly, which occurred in a child eight months old, the attack came on in the first stage. On the fourth, fifth, and sixth days, the dyspnœa was excessive, the respiration running up to 70 and 80; the pulse was frequent and small; the skin pale and rather cool; and the irritability and restlessness very great. For a period of twenty-four hours, we used the poultices and foot-baths every two hours regularly, and gave internally the spiritus Mindereri at the same intervals. Nothing else was done. On the sixth day, when one of the poultices was removed from the interscapular space, the integument beneath was observed to be covered with the measly stigmata, whilst there were none as yet on any other part of the surface. From this time the eruption came out freely, and the child recovered rapidly.

The warm bath may be used under the same circumstances. It should be given with great care, the child being wrapped in a warm blanket the moment it is removed from the water, to prevent the least sensation of chilliness. It may either lie for a short time in the blanket, or be wiped dry beneath it, and then dressed.

In some of the cases of bronchitis, there has been profuse secretion attended with extensive subcrepitant and mucous râles. In such instances we have found the internal use of the syrup or infusion of polygala seneka, with an occasional revulsive, very effectual.

The *diarrhœa* which occurs so frequently seldom requires any treatment. Indeed, unless it indicates evident entero-colitis, or is accompanied by frequent mucous or bloody stools, and by pain and tenesmus, it is better not to interfere with it, beyond paying strict attention to the diet. When attended, however, with the symptoms just mentioned, it must be treated by astringents, by opium and ipecacuanha, and by the application of poultices to the abdomen. The seven cases that occurred to ourselves recovered under the use of laudanum enemata, given twice or three times a day, the strictest diet, and small doses of Dover's powder.

Laryngitis, as it occurs in most of the cases, needs but little treatment beyond careful avoidance of cold, the use of some mild nauseant, and revulsives to the neck. It is very seldom of a dangerous character. When, however, it assumes the character of pseudo-membranous croup, it must be treated with all activity, in the manner described in the article on that disease. In only two of the eight cases we have seen, did it appear at all threatening, and both of these recovered under the use of emetics and moderate leeching of the throat.

The *cerebral symptoms* which sometimes occur, must be treated differently in different periods of the disease. In the early stage, when they last but a short time and do not recur, they require nothing more than a warm bath and the use of revulsives. If they continue to recur, or are followed by stupor or other cerebral symptoms, more energetic treatment becomes necessary. If the child is strong and hearty we may apply dry cups to the back of the neck or temples, and resort to purgaes, revulsives, and cold applications to the head. When the symp-ns are violent, and when the heat is intense, it has been proposed to cold lotions in the manner recommended in scarlatina. The evi-nce upon this point is not very conclusive, and as we have never d them, nor seen them used, nor indeed seen any necessity for a re-t to them, we can offer no opinion in regard to their value.

We have met with five cases of convulsions in the first stage. One urred in a boy five years old; the convulsions were slight, lasted more than ten or fifteen minutes, and were followed by no bad mptoms. The intelligence of the child returned very soon after-rds. The only remedy used was a warm bath. The other cases ve already been described.

When convulsions occur in the second or third stages, it is very im-rtant to ascertain whether they are not the result of some local ease. Two of the three cases that came under our notice accom-nied violent attacks of bronchitis. The third was caused by conges-n of the brain. Here the treatment must be directed against the al disease, if that can be detected. When, on the contrary, the con-lsions seem to depend on nervous irritation, they may be treated th baths, revulsives, purgatives, and the careful administration of ium, as recommended by Sydenham, Copland, Rilliet and Barthez, d other authors, or of bromide of potassium, camphor, assafœtida, sk, or hyoscyamus. If accompanied by intense heat and great dry-ss of the skin, without local complications, cold or tepid lotions may o be tried.

The treatment suitable when any of the complications or sequelæ come chronic, will be found in the articles devoted to the respective eases. Bearing in mind the tendency to the development of scrofula tuberculosis after this disease, the most careful attention should be id to all hygienic measures; and alteratives and tonics, as syr. ferri lid., cod-liver oil, and quinia, should be administered.

ARTICLE VII.

VARIOLA, OR SMALL-POX.

DEFINITION; FREQUENCY; FORMS.—Variola is an epidemic and con-gious disease, characterized by an initial fever, lasting from three to ur days, and followed by an eruption at first papular, then vesicular, d afterwards pustular; the eruption attains maturity in from six to ne days, after which the pustules are converted by desiccation into abs, which fall off between the fifteenth and twenty-fifth days.

The *frequency* of the disease varies greatly in different years, because its epidemic nature. It is far less common in childhood amongst the ddle and upper classes of the community, than either measles or rlatina, in consequence, no doubt, of the attention paid to vaccination. During the early months of 1865, one of us had the opportunity of studying a severe epidemic which occurred in portions of this city, and we have published elsewhere[1] an analysis of thirty cases in children under fifteen years of age, observed at that time. Apart from these cases, however, we had met with but two cases of the disease under fifteen years of age, during the fifteen years preceding 1871-72, whilst during the same period we had met with 263 of scarlatina, and upwards of 314 of measles. In the last-mentioned years, a severe epidemic occurred in this city, when we again saw numerous cases at all ages. It prevails to a greater extent amongst the poor and destitute classes, who neglect the attention to vaccination necessary to preserve children from the disease.

We abstract from the article already referred to, the following table showing the entire annual mortality from variola in Philadelphia, together with the relative mortality during the early years of life, for the twenty-four years ending 1873.

MORTALITY FROM VARIOLA.

	Under 1 year.	Between 1 and 2 years.	Between 2 and 5 years.	Total of all ages.
1848,	21	13	17	100
1849,	25	20	34	152
1850,	13	8	4	40
1851,	40	30	54	216
1852,	89	54	100	427
1853,	22	9	9	57
1854,	12	4	6	49
1855,	57	39	85	275
1856,	86	44	88	390
1857,	19	17	11	65
1858,	1	2	1	7
1859,	0	0	1	2
1860,	14	10	16	57
1861,	159	105	200	758
1862,	52	44	66	264
1863,	33	24	28	171
1864,	57	31	61	260
1865,	104	50	112	524
1866,	32	17	27	144
1867,	16	4	11	48
1868,	0	0	0	1
1869,	1	3	0	6
1870,	3	0	3	9
1871,	203	112	292	1879
1872,	347	188	446	2585
Total,	1406	828	1672	8486

An inspection of this undoubtedly establishes the fact that whenever the contagious principle of variola, favored by some peculiar epidemic uence, is introduced into this community, it finds a large number of protected subjects who fall ready victims to its attack.

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[1] Amer. Jour. of Med. Sci., October, 1869, p. 322.

We shall, in our description of variola, refer to several forms which may assume. These are merely degrees of severity of the same dis- se—types given to each case by several causes. Chief amongst these the presence or absence in the person attacked, of the protective wer of the vaccine disease. Next is the type of the epidemic prevail- g at the time, and last we must place the inexplicable and utterly certain influence of individual constitution. According to the degree reaction of the variolous poison in the system of the patient, shall we ve *distinct* or *discrete*, *confluent* or *hemorrhagic* small-pox; or that form dified by vaccination, inoculation, or previous natural small-pox, led *varioloid*.

We shall also describe the *complications* of the disease.

AUSES.—The principal causes of variola are contagion and epidemic uence.

It is not clearly ascertained at what period of its course the disease t acquires the property of infectiousness. Some assert that it is not til after suppuration is established. This is, however, to say the st, doubtful, and it is best, therefore, to take any precaution that y be necessary to prevent the extension of the disease, from the ment that its real nature becomes apparent. There can be no doubt t the body may still impart the disease after death, and that clothes rn by the patient retain the contagious principle, unless freely ex- sed to the air, for days, months, and, it is said, even for years. It is o capable of infecting furniture or letters, and may thus propagate disease at any distance, and for an indefinite period, by fomites.

One attack protects the constitution, in the great majority of cases, ainst subsequent contagion. When persons who have once had the ease contract it again, it almost always assumes a much milder and s dangerous form.

In the report of the Municipal Hospital of Philadelphia, made to the ard of Health of Philadelphia, for the year 1872, Dr. Wm. M. Welch, e physician in charge, states that out of the whole number of cases 377) of variola admitted during the violent epidemic of 1871–2, 15 ere said to have had a previous attack of the disease. Of these 15 ses, those which could not show a single scar as the result, he should assify as of doubtful authenticity; those which exhibited only a few ars, as of probable authenticity; and those which exhibited well- arked pitting, as authentic. To the first class belonged 7 cases, of hich 3 died; to the second class belonged 3 cases, all of which recov- ed; to the third class belonged 5 cases, all of which recovered, and in of which the eruption was very light, so much so in one as to be racterized as doubtful.

The period of *incubation*, or the time elapsing between the reception the poison and the onset of the malady, varies generally between e and twelve days. It may, however, be seven or fifteen days.

YMPTOMS; COURSE; DURATION.—We shall describe three stages of

chilliness, accompanied with headache, and soon fol
Nausea and vomiting often exist from the first, or con
the appearance of fever and headache. At the same t
of appetite, thirst, and more or less obstinate constipat
is red at the point and edges. One of the characteris
this stage is pain in the loins, which generally dates
second day, and which, though varying much in d
severe. The patients often complain also of abdomi
seem to be colicky, and are referred either to the epig
cal region.

Fever and headache are the most constant of all t
toms. The chilliness and rigors which frequently ex
not easily ascertained in the cases of children, and ar
less important. The fever varies greatly as to degree;
is generally considerable, the temperature rising to 1
may be accompanied either with dryness or moistur
commonly full and frequent, rising to 120, 140, or 160
to the severity of the case and the age of the child.
usually frontal and often very severe. In some cases t
marked cerebral symptoms, consisting of excessive rest
tability, insomnia or somnolence, delirium, and even c

The various symptoms just enumerated continue u
when the eruption begins to make its appearance, wh
erally in the course of the third day, though it may c
the second, or as late as the fifth, sixth, or even sev
and confluent attacks, the eruption, as a general ru
than in mild and discrete cases.

Second Stage, or that of Eruption.—In the great majo
specific eruption makes its appearance in the course
from the beginning of the fever. This is the law of

inion. This roseola occurs in all forms of small-pox. Dr. Welch inks he has seen it most frequently and in greatest quantity in cases mild varioloid.

The specific eruption appears, then, on the third day, in the form of nall, isolated, and rounded red specks, which soon become projecting d solid, or in other words are converted into papules. The papules e from a third to two-thirds of a line in diameter, of a more or less vid red color, which disappears under pressure, to return immediately hen the pressure is removed. They are also hard, and feel almost e shot imbedded in the derm. The eruption shows itself first on the ce, and generally about the chin and mouth, and then extends to the st of the face, to the neck, trunk, limbs, feet, and hands. It some- nes happens, particularly in very young children, that the eruption pears first about the genital organs, whilst in other cases it is first served on the lower part of the loins, or upon the thighs. The pap- es increase gradually in size and prominence for one, two, or three ys, and, as a general rule, some time in the course of the second y of the eruption, begin to change into vesicles. This change takes ace by the formation on the top of each papule of a little transparent evation of the cuticle, beneath which is deposited a drop of serosity. he conversion of the papules into vesicles occurs first on the face, and en on the neck, trunk, and extremities. The vesicles are at first aller than the papules, and acuminated in shape, but as they grow rger, become gradually flattened and depressed in the centre; after a ne they cover the whole papule, and before long exceed it in size. s these changes take place, the fluid they contain loses its transpar- acy, becomes opaline, and by degrees the vesicles are transformed to pustules, and thus the third stage of the eruption or that of suppu- tion begins.

The pocks are more or less numerous, according to the extent and verity of the eruption. When scattered over the surface so as not to uch at their edges, the disease is said to be *distinct* or *discrete;* when, n the contrary, so numerous as to come into contact and run together, is called *confluent*. Of these two varieties, the latter is necessarily ore severe and dangerous than the former, in consequence of the eater extent of tegumentary surface inflamed. During the various anges the vesicles undergo, they are surrounded by small, inflamed eolæ, which differ in appearance according to the number of the ves- les. In cases of the discrete form, in which the eruption is sparse, that the pocks are widely separated, the areolæ fade gradually into e natural color of the skin, at the distance of a third or two-thirds of line or more from the base of the vesicles, whilst in those in which e eruption is more abundant, they run together, so that the spaces etween the pocks are of a more or less bright-red color. In confluent tacks, again, the areolæ are more or less imperfect, according to the anner in which the vesicles are grouped together.

The change of the vesicles into pustules takes place generally from e fourth to the sixth day of the eruption. During this process the

tint. The number of pustules is in proportion, of c
vesicles, but from the increase in size of the pocks
from papules into vesicles and pustules, the eruption,
seems to be greatly more extensive than would ha
at the beginning of the first stage. As a general
most numerous on the face, and after that part on
On the trunk the eruption is always much less abu
parts of the body, and even when confluent in th
the face and neck, it is generally so only in patches
it is discrete on the thorax and abdomen.

Simultaneously with the eruption upon the skin, t
upon the mucous membranes, particularly those o
passages, fauces, eyelids, and sometimes of the pre
begins with more or less vivid redness of the mem
lowed by the production of little elevations, the re
whether papular or vesicular, seems not to be
About the second or third day these red elevations
ance of small, whitish, rounded, and umbilicated
points, which last generally about five days, and
leaving usually a little ulceration or erosion, which
ing a cicatrix.

A short time after the appearance of the pustule
throat, a true inflammation of the mucous membrane
place. When the gums are inflamed they becom
spongy, and are dotted over with white pseudo-me
a rounded shape. Sometimes the velum pendulu
the tongue, present the same white points, with re
of the membrane between. In most of the cases the
general inflammation of the pharynx, which occurs
formation of the variolous pustules. The existence
is denoted by more or less severe sore throat, atte

uring the eruption there is more or less inflammation and swelling he subcutaneous cellular tissue, the degree of which depends on the nt of the eruption. The skin becomes tense, red, shining, and tic under the finger, and more or less hot and painful. The swelling reatest upon the face, where it commences about the fourth or fifth of the eruption, and goes on increasing for five or six days, occa-ing much pain, stiffness, and inconvenience to the child. The swell-diminishes when desiccation begins, and ceases entirely as the er is accomplished.

t is important to study carefully the general symptoms of the second ge. The fever which existed during the initial stage sometimes con-ues during the first day or two of the eruption. When, however, papules are fully thrown out, the fever subsides or disappears en-ly, so that the pulse falls from 100, 120, or 140 beats, to 100, 80, 76, 74, and the heat of skin diminishes at the same time. The child ains without fever usually throughout the vesicular period of the ption, that is to say, until the fourth, fifth, or sixth day; during ch time the appetite sometimes returns, sleep is tranquil and quiet, the patient is in most respects well and comfortable.

bout the fifth or sixth day of the eruption, at which time the matura-of the pustules is nearly completed on the face, and that process is mencing on the extremities, a new fever, to which the technical n *secondary fever* is applied, makes its appearance. The pulse rises in to 88, 100, 120, and 140, and becomes strong, hard, and full, whilst skin is hot and dry. After continuing for some days the secondary r diminishes after the suppuration is fully established, and disap-rs about the time that desiccation is nearly completed on the face, has commenced upon the limbs. It ceases generally, therefore, ut the ninth or eleventh day, having lasted between four and six s. This attack of fever is evidently the consequence of the suppu-ve stage of the disease, or of the conversion of the vesicles into tules.

owards the termination of the second stage, at the very height of disease, when the pustules begin to break and discharge their con-ts, the patient exhales a peculiar, disagreeable, and fetid odor, which haracteristic of the disease.

he *third* or *declining stage* is that of the desiccation or drying of the tules, and their desquamation. The desiccation commences generally ween the sixth and ninth days, and terminates between the tenth fourteenth. The formation of the crusts begins upon the face and ends thence to the neck and limbs. It does not reach the limbs ally until about two or four days after it has commenced on the . The mode in which the drying of the pustules takes place is not same in all. In some a dark point is formed in the centre which dually extends and converts the whole pustule into a hard crust; in ers the whole surface dries at the same time; while in others again, epidermis gives way and allows the contained fluid to escape, which hardens into yellowish, irregular crusts, which become brown before they fall off. Some of the pustules, particularly those upon the arms and legs, do not form scabs at all, but shrink away from the absorption of their fluid, leaving behind nothing but pellicles of cuticle, which fall off by desquamation.

The desquamation or falling of the crusts begins from the eleventh to the sixteenth, and ends somewhere between the nineteenth, twenty-fifth, and even fortieth days of the eruption. When the scabs fall off, the appearances presented by the skin beneath vary in different cases. In some a true ulceration and loss of substance of the derm has taken place, which gives all the characters of a suppurating ulcer when desquamation has begun early in the disease; when that process occurs at a later period, the ulcer is found to be dry and cicatrized. In both these forms of desquamation, the cicatrices form little pits or depressions, which remain during life. In other instances, the fall of the scabs leaves red and excoriated surfaces which are on a level with the surrounding skin, but which soon dry, leaving blotches of a reddish-brown color, that do not disappear entirely for months. No cicatrices remain when desquamation takes place in this manner. In a third series of cases the crusts do not fall until the surface beneath has completely cicatrized, and the only traces left behind are more or less deeply tinted reddish spots, with occasional slight furfuraceous exfoliation of the cuticle, all of which disappear entirely after a time without leaving pits or cicatrices.

To conclude the account of the symptoms of the disease, we have a few words to say in regard to the condition of some of the important organs throughout the course of the malady.

The *tongue* presents no appearances peculiar to the disease, other than the eruption already described. It is generally moist, more or less furred, and either pale or red in color. The *abdomen* usually remains soft and undistended, though in some instances it is slightly tumid and hard, with occasional pains in the epigastric, umbilical, or iliac regions; in simple cases, the latter symptoms rarely last more than a short time, and when otherwise they are almost always the sign of some complication. The *constipation* which exists during the initiatory stage generally continues throughout the disease, though in some instances a slight diarrhœa occurs about the end of the first or second week, after which the bowels regain their natural condition. If severe diarrhœa should make its appearance, it is almost always the sign of a dangerous complication. The *nausea and vomiting* which are so often present during the initial stage, cease after the appearance of the eruption, and recur only in rare cases, or in consequence of some complication. The *appetite* is almost always lost during the course of the disease, though it sometimes returns in the period between the termination of the initial and the commencement of the secondary fever; *thirst* is acute as a general rule, and more or less so according to the violence of the fever.

The *urine* presents, during the course of the disease, the ordinary febrile characters of lessened quantity and heightened color. The rea, uric acid, and pigment are increased, and the chlorides much iminished. Albuminuria is occasionally present at the height of the isease; it is, however, temporary, and apparently not of very grave mport. Casts of the renal tubules are also present in some cases. he frequency with which this condition exists probably varies in differnt epidemics, since we have detected it but rarely in our cases, while arkes states that it is present in about 30 per cent. of all cases. After he subsidence of the secondary fever, the urine frequently becomes ery abundant, of pale color, and of low sp. gr. Thus, in one of our ases, in a girl aged 18 years, the daily amount of urine passed from he tenth to the thirteenth day of the eruption was f℥clx, or ten pints, f sp. gr. 1001, as clear as spring-water, containing no albumen, but ith a fair proportion of chlorides. In another case, in a young man ged 20 years, the patient also passed, on the eighteenth day, f℥clx of rystal-clear urine, of sp. gr. 1007, without albumen but containing bundant chlorides. In a third case, in a boy aged 13 years, the amount, n the twelfth day of the eruption, was f℥xlv.

The *strength* of the child is not, as a general rule, greatly diminished, xcept in severe and dangerous cases. *Restlessness, irritability, crying, nd delirium*, which are of such frequent occurrence in the febrile disases of children, are not usually very strongly marked in regular cases f variola. They exist, but it is to a moderate extent only.

We pass on now to the *confluent* forms of the disease.

It is not possible to predict from the character of the initial fever hat is to be the type of eruption which is to follow, since in discrete ariola, and even in varioloid, the precursory fever and other sympoms, often run alarmingly high, while, on the other hand, a case desined to be confluent, or even hemorrhagic, does not always exhibit iolent phenomena at the outset. As the time for the eruption aproaches in confluent cases, the skin usually gives evidences of active nflammation of its deeper structures. It becomes thickened, swollen, ard, dark in tint, and as the eruption advances, the countless number f papules and vesicles, which cover all parts of the body, increase the iolence of this inflammatory action, and give rise to an earlier appearnce of the secondary fever, which is marked by higher temperature, ore active delirium, and greater disturbance of the circulation than n discrete or moderate small-pox. As the vesicles form upon the papes, they so crowd the surface that their edges run together, thus aking the confluence, and no portions of natural skin remain on which o form the areolæ, which therefore are absent. As the pustules follow he vesicles they do not develop well, but remain flattish and sluggish, with a whitish, ill-concocted pus on some parts of the body, paricularly the face and backs of the hands. They run together into arge flat blebs or bullæ, of several inches or more in extent. Someimes portions of the loosened cuticle are rubbed off by the movements n bed, or by scratching. The parts thus denuded look raw, and exude sanious fluid.

In severe confluent cases the eruption extends to the mucous membrane of the nose, mouth, fauces, eyelids, and perhaps to the prepuce or vulva, as in the distinct form, but with very different severity and consequences. The inflammation produced by the eruption causes enlargement of the tongue, swelling of the fauces, pain, and often great difficulty of swallowing. The rawness and soreness of the passages, and an abundant and usually dark-colored viscid secretion, which clogs and clings to the parts, cause great distress, and add to the exhaustion of the patient. At the same time the laryngeal catarrh causes cough, hoarseness, partial or total loss of voice, and difficulty of breathing. Thus, as in violent anginose scarlet fever, and in some cases of diphtheria, the supply of air to the lungs is so diminished by the various causes of obstruction (swelling, collections of viscid phlegm, and spasm of the glottis) that the blood does not receive its due amount of oxygen, a venous stasis is established, the skin becomes dark-brown or purplish from capillary stagnation, and the patient dies, sometimes in great distress, though at others with very little apparent suffering, in a state of asphyxia and exhaustion.

In some cases the heart presents evidences of disease; the sounds become feeble and obscure, the impulse weak, and the action of the heart irregular and intermittent. These symptoms, to which special attention has been called by Desnos and Huchard,[1] are dependent upon grave inflammatory changes, either in the endo- or pericardium, or frequently in the muscular tissue of the heart. In cases where this latter lesion is present they have occasionally observed a want of agreement in frequency between the contractions of the heart and the radial pulse; and also, but as a much more constant sign, a murmur at the apex of the heart, soft, deep, diffuse, and inconstant, which differs in its character from the murmur which attends endocarditis of the valves. Undoubtedly in many cases of variola where death occurs suddenly, with signs of failure of cardiac power and pulmonary engorgement, the fatal event will be found to depend on the development of one of these cardiac lesions, and especially of myocarditis.

There is a form of confluent small-pox called superficial confluent, in which, though the eruption is really confluent, it runs through the stages of maturation, desiccation, and desquamation so rapidly that the constitution is not greatly tried, and the patient recovers without difficulty.

Even in the severe form, the patient may, if his constitution be good, pass safely through the disease.

The *hemorrhagic, malignant,* or *petechial* form is happily rare. We had rarely seen it until the epidemic of 1871–72 showed it to us in all its terrible power. Our forefathers knew all about it. We, of the generation which has risen since the introduction of vaccination, had read of it, but took little heed of what the variolous poison might do when it exerted its malignant forces. In this form the patient is weak and feeble from the beginning. The surface assumes a singular reddish hue as the eruption comes out. The vesicles when they form upon the papules, instead of filling with lymph, and then pus, contain only a thin, sanguinolent liquid; they mature very imperfectly, or rather not at all, not acuminating but remaining flattish, or irregular in shape, and flabby. While the eruption is struggling along in this irregular mode, the vessels of the cutaneous tissues become gorged and partially stagnant, so as to give to the surface dark red, brown, blue or purplish, and livid tints. Extravasations take place amongst and beneath the eruptive points, the cuticle forming the bloody pocks breaks, blood exudes, and forms dark scabs, and the patient is so changed from his natural aspect that we may comprehend how in the olden time, people who had not the consolation which vaccination gives, may have been driven from the bed and even from the house of the sufferer in hopeless terror. Such cases look no longer human. The swollen face, purple or black, the dark or crimson-red eyeball, with the whitish cornea sunken into a pit formed by the projection of the blood-colored and œdematous conjunctival membrane, the eyelids thick and stiff and imperfectly closing, the gross body, changed from all its natural bright to blackish tints, the cuticle dissected from the skin by bloody exudations, which weep and stain the clothing and bed-linen. Such is the variola nigra or black small-pox of the old writers, and well does it deserve its name.

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[1] Des complications cardiaques dans la variole, Paris, 1871.

VARIOLOID, OR MODIFIED SMALL-POX —This is a term now usually applied to the modified form of the disease, as it occurs in individuals who have been vaccinated, or who have already had the natural or inoculated disease.

Dr. Welch's rule is a very good one,—"to classify as variola all unvaccinated cases, no matter how mild, all malignant cases, and all the vaccinated cases in which the eruption does not reach maturity until after the sixth or seventh day from its first appearance." The true point of distinction here, when any uncertainty as to vaccination exists (and this is not rare amongst the poor), is the time of maturation of the eruption. This, in varioloid, ought to be matured and in the decline by the sixth or seventh day.

The initial symptoms of varioloid are of the same general kind as those of natural small-pox, differing merely in degree. But the physician ought to know that, in a few cases of even very mild varioloid, while the eruption is destined to be sparse, to consist of but few pocks, and to run through its stages in five or six days, the initial fever may be very high, and the attendant phenomena of pain, nervous disturbances, loss of strength, &c., very marked. We once saw a girl nine years old, who was ill for three days with very high temperature, delirium, stupor, prostration of strength, violent headache, and rapid pulse, so that her case looked very threatening, and left the diagnosis in great doubt. On the third day a moderately abundant variolous eruption came out, when all the unpleasant symptoms rapidly abated and disappeared. The eruption ran through its stages in six days, and the patient recovered without a pit. She had been well and carefully vaccinated in infancy.

the child often seems perfectly well.

The progress and character of the eruption are very s
of the regular form of the disease, with the exception th
are more rapidly effected, and, as a consequence, the c
attack is rendered by so much the shorter. The papules
into vesicles at a much earlier period—as early as the
day. The vesicles soon assume a whitish, opaline appe
umbilicated, and in the course of the second or third day b
into pustules. The suppurative stage of the eruption,
is seldom accompanied by any marked secondary fever, as
disease. When the fever does occur, it is generally v
consisting merely in slight acceleration of the pulse a
creased heat of skin, and in one or two days it disap
The pustules do not fill usually so well as in regular va
unfrequently their contents are rather sero-purulent, th
the proper sense of the term. The third stage occurs e
through its periods more rapidly than in true small-po
soon takes place, is speedily finished, and the falling of th
begins as early as the eighth day of the eruption, is usu
about the twelfth or fourteenth. After desquamation is
only traces of the disease left are reddish spots or blotc
appear after a time without leaving cicatrices. The wh
the attack is generally from ten to twenty days.

Varioloid may be so mild that the patient never goes
malaise, a little loss of appetite, the appearance on the
dozen papules, which soon become umbilicated vesicles, a
form scabs, constitute the whole history of some cases.
a correct diagnosis is invaluable to the family. To the
no consequence. He is safe, but he may inoculate any
who have not been properly protected.

COMPLICATIONS.—The most frequent and important co aving mentioned the possibility and probability of their occurrence, e must leave the reader with the advice always to suspect the exist- ice or approach of some one of them, when the symptoms, in any case, ffer much from those which have been described as characteristic of ie regular form.

ANATOMICAL LESIONS.—The characteristic lesions of small-pox are a rtain deteriorated state of the blood, congestion of the internal or- ins, and the inflammation of the skin and mucous membranes consti- tting the eruption. The blood is found to be entirely liquid and un- agulable, and of a dark color; or if coagula exist, they are small, soft ad very dark in color. The exceptions to this rule are those in which me acute and severe inflammation exists, under which circumstances ie dissolved state of the blood is less marked, and fully formed co- gula are more abundant. The congestion referred to affects almost the hole system. The muscles are firm and of a deep red color; the mem- ranes of the brain are strongly injected, the sinuses are filled with lood, and the cerebral substance presents numerous red points or dots. he vessels of the lungs contain a large quantity of blood, and the liver, pleen, and kidneys, are all deeply congested.

The condition of the mucous membranes is important. The pharynx, rynx, and trachea, present an eruption, or simple inflammation with- ut eruption. The eruption exists under the aspect of small, circular, hin, and whitish pseudo-membranous points, scattered over the mu- ous tissue, and slightly adherent to it, beneath which that tissue is ften observed to be red and inflamed. At a more advanced degree, nd in severer cases, the false membranes have disappeared, and in their laces we find circular ulcerations, which are either superficial, or they enetrate the tissue of the mucous coat and rest upon the muscular, or ven pierce that and reach to the cartilaginous tissue beneath. In ad- ition to these lesions are found inflammation of the mucous tissue with its consequences, redness, softening, thickening, and extensive eposits of false membrane, quite distinct from the appearances above escribed as characteristic of the eruption upon these tissues.

It has been a contested point whether a true vesicular or pustular ruption ever exists upon the mucous lining of the stomach and intes- ines. The general opinion appears now to be, however, that the hanges observed in these organs cannot be ascribed to the formation ther of vesicles or pustules. The appearances that have led some ob- rvers to consider them as the result of a proper eruption, are the fol- wing. The follicles at the commencement and termination of the nall intestines, and in rarer cases, of the large intestine also, present n abnormal degree of development, appearing in the form of small emispherical or pointed, and sometimes flattened projections, on which ere often exists a dark, and sometimes depressed central point. At ie same time Peyer's glands are often enlarged, more projecting than sual, softened, and red.

According to the valuable researches of Desnos and Huchard (*loc. it.*), the heart and pericardium present marked lesions in a considerable

a vesicle is opened soon after its formation, it is
nothing but a little serosity which is perfectly limp
while the skin beneath is red, softened, and moist.
character depends on a filiform adhesion between the c
and the surface of the skin beneath. This adhesion i
at a later period, the pustule becomes globose in shape
also subdivided into several chambers by delicate radi
so that a single puncture will not discharge the entire
the period of the conversion of the vesicles into pustu
after the formation of the latter, the cavity of the pock
contain a false membrane, which is of an opaque whit
friable in its texture, and seated upon the derm in smal
After a time these points enlarge, and meeting, unite,
pseudo-membranous disk, uneven upon its surface, a
fills the pock completely, or is covered at first with se
wards with pus. This false membrane is secreted o
true skin. At a somewhat later period it forms an
inner surface of the cuticle, while still later in the
pock, it becomes detached from the cuticle, and remai
in the cavity of the pustule, surrounded by the fluid
latter.

DIAGNOSIS.—The diagnosis of this disease in all its f
made as early as possible, in order that the persons in
patient, whether from necessity or by accident, may
revaccinated. It is well known that exposure to the
may produce in the unprotected any form of small-p
to malignant, according to the constitution of the subj
of epidemic prevailing. Therefore the only safety aft
the vaccine disease, and, therefore, the lives of the ex
the knowledge and action of the physician in charge,
from which he cannot escape either in the estimate of

stage of areola before there is any illness from small-pox. "It has
fore been stated that when small-pox has been taken into the system
ere is twelve days' freedom from illness, generally, forty-eight hours'
ness, and then the disease begins to appear on the skin. The areola
vaccination is not fully formed until the ninth or tenth day of the
ogress of the vaccine vesicles on those who have never been vacci-
ated before, so that unless there has been time for the areola to be
rmed after the vaccination, before the illness produced by small-pox
gins, the vaccination will not be of the least benefit." He gives an
ample: "Suppose an unvaccinated person to inhale the germ of a
ariola on a Monday; if he be vaccinated as late as the following Wed-
esday, the vaccination will be in time to prevent the small-pox being
eveloped; if it be put off until Thursday, the small-pox will appear,
at will be modified; if the vaccination be delayed until Friday, it will
e of no use, it will not have had time to reach the stage of areola, the
dex of safety, before the illness of small-pox begins. This we have
en over and over again, and know it to be the exact state of the
estion. Revaccination will have effect two days later than vaccina-
n will have that is performed for the first time, because revaccinated
ses reach the stage of areola two or three days sooner than in those
rsons vaccinated for the first time."

It is plain, therefore, that the diagnosis ought to be made as early as
sible. Can it be made in the initial stage? Not, we think, with
y certainty. Except in a time of general epidemic prevalence, cases
small-pox are almost unknown, and varioloid is very rare amongst
ldren, and the medical man thinks of anything but varioloid or small-
x to explain a fever attended with vomiting, anorexia, restlessness,
drowsiness in the infant, and the same symptoms with headache and
eral soreness in the older child. The initial fever has no character-
ic phenomena. When the disease is epidemic, the initial fever, as it
s been described, may arouse suspicion, and the attendant physician
y dare to announce the probable approach of the dreaded disease,
d examine all the exposed persons as to their being fully protected.
t this course is justified only by the presence of the epidemic. Not
til the eruption begins to appear can the diagnosis be made with
tainty; and however easy it may be for old and experienced phy-
ians to make it then, we desire to caution the younger and more in-
perienced as to the possibility of mistake.

The important points to bear in mind are the following: 1. The pro-
omic stage, whether of mere ailing and lassitude, such as may not
d the patient to bed, or violent fever with nervous symptoms and the
ferent signs which declare a severe disease, which lasts two days, and
the third of which, as the law, the eruption makes its appearance.
The eruption appears first on the face and about the upper part of the
ck, and consists of hard, distinct, shotty papules, seated, in mild cases,
a nodosal skin. 3. As the eruption appears, the fever diminishes.
ese three points kept steadily in view will usually prevent any mis-
ke.

and very soon they run together and assume irregula
lines. By the second day of the disease there is rare

Varicella, which from its name, one would think, o
variola closely, has rarely given us any trouble. Th
of varicella never lasts over a day; it often consists
night, and sometimes the first thing to attract the
mother or nurse is the eruption. When the prodromic
it consists merely of some lassitude or irritability, los
slight fever. The eruption shows itself at once upon
and back of the body. So much is this the case tha
the child undressed in order to get a good view of th
spection, a number, three or four or a dozen, or ve
projecting, globose vesicles are to be seen, consisti
transparent layer of the cuticle, filled often to bursti
serum, there ought to be no difficulty in the diagnosi
tion, appearing with scarcely a prodrome, or merely
twelve or twenty-four hours, cannot be small-pox or

In very mild varioloid, where the eruption counts
half a dozen vesicles, and where the prodromes are v
always easy to be quite secure in one's opinion, and
perienced person might very well fail to detect the t
disorder. But even here careful inquiry will genera
health has been disturbed for two days, at least by al
situde, lessened appetite, and one or two restless ni
dromes, when followed by a few hard, distinct papul
on the second day vesicles, and then umbilicated pust
the fourth, fifth, or sixth, can be nothing but variolo

Again, in severe cases of small-pox itself, embarras
occur. We once saw an infant, five weeks old, wh
out of the mother's room, seized in the midst of pe

the city. Even in such cases, however, where a deep roseolous or ythematous efflorescence precedes and masks the variolous eruption, e violence of the prodromic symptoms, so unlike the mild phenomena hich precede ordinary roseola or erythema, and particularly the in- nsity of the coloration and the hard and swollen condition of the in, indicating active inflammatory states of its deeper layers, will go r to prepare an experienced eye for what is coming.

PROGNOSIS.—The fatality of small-pox varies greatly in different epi- mics. The result is also markedly influenced by age. It is particularly tal in infants under one year of age. Of the whole number of cases, 77, admitted into the Municipal Hospital of this city in 1871–2, there ere 35 children under one year of age. Of these 26, or 74.28 per nt., died. Between the ages of 1 and 15 years there were 291 cases, of hich 95, or 32.64 per cent., died. The mortality was therefore nearly ree-fourths of the whole number under one year, and very nearly a ird of those between 1 and 15 years of age.

Of a series of 23 cases that we have met with, 5 were fatal. All of ese were under 5, and 3 under 1 year of age.

The amount of the eruption governs the prognosis to a great degree. s the number of pocks is abundant or otherwise,—as the case is a dis- ete, moderately full, semi-confluent, or confluent one,—so is the anger. Cases of full confluence are almost as fatal as malignant scar- tina. Few children escape in the confluent form. A moderately full uption, and of course a discrete one, is favorable. The hemorrhagic rm is, almost without exception, fatal. Varioloid rarely kills. Under 5 years of age we have never seen a fatal case of it. In one case only ave we known it to be dangerous.

The favorable symptoms in any case of variola are the occurrence of e disease in children previously in good health and over one year of ge; the absence of any violent nervous symptoms during the initial age; a proper duration of the first stage; and the subsidence of the ver after the appearance of the eruption. When, in addition to these rcumstances, the secondary fever is not too violent, and no complica- on arises, there is but little doubt that the patient will recover.

The unfavorable symptoms are the occurrence of the disease at a ery early age; the existence of severe nervous symptoms during the st stage; the occurrence of a thick and abundant eruption upon the ce, indicating a probably confluent case; continuation of the fever ter the appearance of the eruption, or a merely slight subsidence of ; delirium and other nervous symptoms during the secondary fever; d any irregularity in the appearance of the eruption, as paleness in- ead of the usual red color, a livid or purplish color of the pustules, im- rfect development of the pocks, or their sudden shrinking without minution of the general symptoms. The occurrence of the signs hich mark the hemorrhagic form, as petechiæ and local hemorrhages, amp the case as almost necessarily fatal. It is scarcely necessary to say at many of these symptoms are indicative of the existence or threat- ed production of some complication, upon the nature of which initial fever, rest in bed, light diet, and the use of swee in iced lemonade, often suffice. Should there be much somnia, or pain, solution of citrate of potash, with smal num or paregoric, may be given. When the eruption a slight, and the fever disappears, nothing more is nec keep the diet moderate and seclude the patient in on sake of others, until the crusts have fallen. If the er copious, enough to cause a good deal of irritation an warm bath at night, especially with some bran adde application through the day of an ointment of glycerin with a mild opiate at night, are all-sufficient.

In the variola of unvaccinated children, the treat depend on the type of the symptoms. In the initial fever is high, the child must be confined to the brea nursing, and, if weaned, it is to be kept upon a proper and water, with lime-water, and upon chicken or bee Cold water must be frequently offered to the child at should be allowed to take all it desires. A tepid bat evening, or even three times a day, if the child does no soothing, and tends to reduce the heat. Spongings wi water, from time to time, according to the degree of effects of the application, may be used, if the bath ter reduce the fever.

Diaphoretics, and especially the citrate of potash, wi of nitre, and very small proportions of laudanum, sho tered in this stage. Or the spirit of Mindererus may be to thirty drops, with ten drops of nitre and five of pare spoonful of iced water, every two hours, to children of two years. For older children the doses must be enlar

When there is, as often happens, great agitation system, as shown by jactitation, insomnia, and mild or

When great heat and swelling of the skin, severe headache, and signs congestion of the lungs or brain, exist, cold applications to the d, with hot mustard foot-baths, may be used with the diaphoretics. in older children, the headache or pain in the loins be very severe, ew dry cups or a sinapism may be applied to the back of the neck loins.

If the bowels are not moved spontaneously, a moderate laxative ght to be used, as syrup of rhubarb or castor oil, or an enema may ordered. Purging with large doses of cathartics, must be avoided all ages.

In the eruptive stage the treatment must vary with the type of the uption and the constitutional peculiarities of the patient. It may be d down as a rule that, the more copious the eruption, the more care-lly should the strength be husbanded, and the vitality supported, to able the patient to pass through the long and exhaustive processes of aturation and desiccation necessary to a cure.

If the eruption come out slowly and tardily, and the extremities be ol, even though the body is hot, hot mustard foot-baths, or warm ths, with hot drinks, as milk and water, hot broths, and small quan-ies of brandy, ought to be employed, and are often very useful.

If the eruption be discrete and moderate in amount, nothing but rest bed, simple sustaining foods, and some local remedy to allay cutane-s irritation, as an ointment or an occasional warm bath, will be nec-sary until the secondary fever appears. When this arrives, the same eans, in the form of diaphoretics, anodynes, and nervous sedatives, ould be used as in the initial stage. In the stage of maturation the rength must be sustained by a diet adapted to each particular case. the patient be feeble, and therefore much reduced by even a moder-te eruption, he must have brandy added to his milk, or wine-whey, om time to time, increased doses of beef or chicken soup, if he can ke them, and, if old enough, eggs, or egg-nog. Quinia and muriated ncture of iron should be used as in confluent cases, of which we shall eak directly.

In the semi-confluent and confluent cases all must be done to sustain e strength and vitality. From an early period of the eruptive stage, ohol, quinia, and iron, must be employed. From twenty to thirty ops of brandy, in a wineglassful of milk, may be given every two urs, and two or three tablespoonfuls of thin beef tea, every alternate o hours, at the age of two or three years. After the age of five, ese quantities may be doubled. To infants, brandy, in doses of ten twenty drops, may be given every two hours, in breast-milk, or in rm water and sugar. Quinia, in doses of half a grain, at a year old, d one grain at four and five years, with or without muriated tincture iron, ought to be administered every four hours. It is best to choose four-hour interval, because of the difficulty there is in giving fre-ent doses to children. If the stomach will not retain the iron and nia mixed together, the quinia may be used in suppository, two ins every four hours, and the tincture of iron in doses of two to five

n of nitrate of silver, a grain to the ounce, or of one or two
f sulphate of zinc, with twenty or thirty drops of wine of opium,
d in an ounce of rose-water, two or three drops of either of
nay be introduced into the eye, morning and evening. An ex-
collyrium is one composed of twelve grains of borate of soda,
in of sulphate of zinc, a drachm of camphor-water, to seven
s of distilled water.

rh of the intestine must be treated by the most careful attention
diet, by emollient and anodyne injections, and by the internal
stration of astringents, and small doses of opiates.ˋ When the
a is severe, and the stools mucous and bloody, we may use with
ge the nitrate of silver by enema, as recommended in the article
ro-colitis.

treatment of the convalescence is important. The same rules
ere as in other infantile and children's diseases.

lation and Disinfectants.—It is even more important in this dis-
an in others, for the physician to see to it himself that the rooms
d by the patient, and the house of which they form a part, shall
ventilated, and that so soon as the eruption becomes purulent,
exhalations more or less fetid, proper disinfectants shall be ap-
This is necessary, not only for the good of the patient, but also
safety and comfort of the other inmates of the house. The
ntilation in winter is that procured by an open fire, or, if this
be had, by a stove. If the room can be warmed only by a furnace,
dows must be very carefully opened from time to time, so as to
fresh air, and yet avoid currents flowing over the patient. In
r, of course, the windows must be open.

best disinfectant is Labarraque's solution. If this cannot be
if more than one be desired, chloride of lime in saucers, wetted,
xture of equal parts of impure sulphate of iron and of chloride
, wetted, and placed in saucers, in the entries and passages of
se, are very efficient.

re terminating our remarks upon the subject of small-pox, it will
er to give some account of the treatment of the eruption which
n recommended and practised, with a view to prevent the scar-
d disfiguration which so often result from the ravages of the
. Of the different means that have been employed with this
here are two which are chiefly relied upon at present. One is
terize the pustules with nitrate of silver, and the other to
a mercurial application upon the part where it is desirable to
he abortion of the eruption. The cauterization has been per-
in two modes; by the application of the caustic to each pustule
ely, or to masses of the eruption without puncturing the cuticle.
ars, however, that the first-named method is much the most
ble. To succeed perfectly, it is necessary to touch the derm
the base of the pustule; so that the best plan is to remove or
portion of the top of the vesicle with a lancet, and then to in-
into its interior the sharpened point of a stick of caustic. This

ve-mentioned been taken, it is not improbable that the effects would
e been still more decided."

The use of the mercurial application is attended with some incon-
ience. In the first place it is difficult to keep it accurately applied,
ticularly in children, in consequence of the unpleasant sensations it
asions. In the second place, it not very unfrequently, according to
I. Rilliet and Barthez, produces an eruption of hydrargyriasis or
rcurial roseola, in about eight or fourteen days after the variolous
ption, or four or ten after the application of the remedy. M. Rayer,
wever, states this effect to be a rare one.

Dr. Stewardson says that he thinks no apprehension need be felt as
constitutional affection from the mercury, for scarcely ever were the
ms even touched. One of ourselves, however, when in Paris, in 1840,
this effect produced in a young girl at the Children's Hospital.

The method of its application is different in different hands. The
ench generally employ the emplastrum de Vigo cum mercurio. Dr.
wardson prefers the strong mercurial ointment, either pure or rubbed
wn with an equal bulk of lard, spread upon a piece of thick muslin.
e muslin is to be cut into the shape of a mask, with apertures for the
es, nose, and mouth. It is secured upon the face by means of strings
ached to its margin and tied across the back of the head and neck.
s important always for the success of the measure, that the applica-
n should be kept in close contact with the skin. To insure this, he
ployed a separate piece of muslin for the nose, which is the part
st difficult to fit. With the same view, the French authors recom-
nd that the plaster should be cut in pieces to suit the different por-
ns of the face, making one for the forehead, and others for the cheeks,
es and back of the nose, and upper and lower lips. Any spaces that
y remain are to be covered with other portions of the plaster, and
whole secured with strips of diachylon. On account of the diffi-
ty of applying the mercurial plaster, the following ointment was
npounded by the apothecary of the Children's Hospital at Paris, and
been found to answer very well:

R.—Mercurial Ointment,	24 parts.
Yellow Wax,	10 parts.
Black Pitch,	6 parts.—Mix.

The application ought to be confined to the face, as that is the part
ich it is most important to save from disfiguration, and as it is better
to use it upon a larger surface than necessary, lest it might occasion
mercurial roseola, or possibly salivation. As a general rule, four
five days are sufficient, according to Guersant and Blache, to leave
in contact with the skin, in order to avoid the bad effects just re-
red to.

The object sought in these applications being, to a great extent, to
tect the vesicles from contact with the atmosphere, it has been ad-
ed to paint a saturated solution of gutta percha in chloroform, over

the neck and face, so soon as the papular eruption is fully out. This plan was tried in five of our own cases (*loc. cit.*, p. 345), two of which were discrete, and three confluent, and with very satisfactory results.

To conclude this matter we will add that Niemeyer states that Skoda prefers compresses moistened with solution of corrosive sublimate (gr. ij–iv to water ℥vj) to mercurial plaster, which induces an injurious elevation of temperature. He also says that Hebra rejects both mercurial plaster and solution of corrosive sublimate, as well as collodion, and touching the individual pocks with nitrate of silver, and that he has come to this decision from the observation in his wards, that the pocks do not leave cicatrices any oftener since he has ceased to employ these remedies than when he used them. He (Hebra) applies only cold water compresses, which, while the skin is tense, relieves the patient, although they do not protect the skin from destruction.

ARTICLE VIII.

VACCINE DISEASE.

Definition; Synonyms; History.—The vaccine disease is an affection produced by the inoculation of the virus of variola, modified by passing through the system of the cow.

The proofs which exist as to the truly variolous nature of the vaccine disease in the cow, are altogether incontestable; so that we must regard the vaccine disease in the human subject merely as a remarkably modified form of variola.

It is susceptible of propagation from individual to individual by inoculation, but is contagious in no other way, and it possesses the invaluable quality of protecting, with very great, though not with absolute certainty, those through whom it has passed, against small-pox.

Besides the name given above, it is known by the titles of cow-pox, kine-pock, vaccina, and vaccinia.

Some knowledge of the nature of the vaccine disease, and of its power to protect the human constitution against small-pox, has been found to have existed in different parts of the world, but there can be no doubt that we owe to the genius and patient research of Dr. Jenner the inestimable blessing of vaccination, since it was by him that its marvellous virtue was first demonstrated and proclaimed to the world. Dr. Jenner learned, at an early period of his life, that there existed a popular belief in Gloucestershire, England, that persons who had contracted a peculiar vesicular disease from the udder of the cow, were thereby protected from the attack of small-pox. Becoming convinced by a long course of patient observation, that this belief was founded in fact, he determined at last to try whether the disease might not be transmitted from one person to another, and thus increase immeasurably the utility of wonderful protective means. On the 14th of May, 1796, accord- r, he vaccinated a child eight years old with matter taken from the ls of a milker who had received the disease from the cow. The ex- ment succeeded perfectly, the child having received and passed ugh the disorder in the most satisfactory manner. On the 1st of following, this child was inoculated with variolous matter, and re- d the contagion entirely, as Dr. Jenner had expected. It was not, ever, until two years later, in 1798, after additional experiments, the results of his researches were published to the world. From time the belief in the utility of vaccination and its application in tice spread rapidly throughout England. In 1799 it was introduced this country; in 1800 it reached France, and in the course of a few years extended to all civilized nations.

MPTOMS; COURSE.—It is very important for the physician to be oughly acquainted with the appearances presented by the vaccine ase in its various stages, since he is to judge by those appearances ther the subject has had the disease in such perfection as to derive he benefit from its protective power which it is possible for it to art.

he first effect of the puncture by which the virus is introduced into tissues, is to produce a very slight redness at the point where the ation is performed. This redness usually disappears within twenty- hours, and there is left merely a little mark or scab at the point of rtion. On the third day after the operation we first begin to per- e the specific effects of the virus, in the shape of a small, hardened t at the seat of the wound, surrounded by a faint, erythematous ess. Over this hardened point, which grows gradually larger, the cle is elevated on the fifth day into a vesicle, by a thin, transparent, pearl-colored serous exudation. This vesicle soon becomes umbili- d, so that by the following day, the sixth, the depression in the cen- constituting the umbilicated character, is generally perfectly mani- and at the same time the vesicle is surrounded by a very narrow of inflammation. The vesicle continues to increase in size, until he eighth or ninth day it has reached its highest degree of develop- t. At this stage the vesicle or pock is large, usually about one- d of an inch in diameter, and it projects very considerably above general surface. Its shape is circular, as a general rule, though unfrequently it is oval, this depending apparently upon the mode which the puncture has been made. The color of the pock is dull te or pearly, or sometimes it has a yellowish tint. The quantity of l contained in the cavity of the vesicle differs, of course, according ts size. The structure of the pock is found, upon careful examina- at this time, to be cellular, the number of cells amounting com- ly to eight or ten; very often there is a small, dark-colored scab he very centre of the vesicle, even at this period, though in other ances this is absent, the surface of the vesicle being formed exclu- ly of thin and transparent cuticle. The scab just alluded to has ned to us to consist of the little incrustation, formed at the point features of the vaccine disease. The color of the ring at the edge of the vesicle, and then fades gradually boundary. On the ninth and tenth days, in connection the skin and cellular tissue on which the vesicle is sea a short distance beyond the margin of the latter, beco tumefied, forming a solid knot or lump in the derm, li furunculus. The inflammation which causes the areola i as to occasion the production of vesicles, which are al coverable with the aid of a lens, and are sometimes dis the naked eye. On the tenth day the disease is usual and it is then, of course, that all its peculiar characte strongly marked. At this time the child, when of an its sensations, will often complain of heat, itching, and flamed spot; the arm is heavy and not willingly move with care and caution; there is, in a good many instan tion and swelling of the axillary glands, and very freq febrile reaction may be noticed. In other cases, on th of these symptoms will be present. The child is gay movements free, quick, and unembarrassed, and it seem to be in its ordinary condition of health.

From the tenth day the disease begins to subside. T so as to have nearly disappeared by the fourteenth day tained in the vesicle is gradually converted into pus, structure of the pock is broken down so as to form, by day, but a single cavity, in which the pus is contained desiccation is going on rapidly during this time, so tha teenth day the vesicle has disappeared, and in its place hard scab, of the shape and size of the vesicle. This s ark of the disease, the scar should be small, circular, of a smooth and mewhat shining appearance, and it should exhibit radiations and tle depressions or pits. The depressions are supposed to have been used by the cells constituting the pock in its early period.

There is rarely more than a very slight constitutional disturbance endant upon the course of this disease. About the eighth day, a de- ed febrile reaction, attended with some unusual warmth of the sur- e, restlessness at night, and fretfulness of the temper, is often ob- rved. In a few instances we have noticed distinct disturbance of the lth about the third and fourth days; amounting only, however, to usual irritability and discomfort through the day, and to wakefulness disturbed sleep at night.

RREGULARITIES AND ANOMALIES.—We have now described the regu- course of a vaccination—that which it pursues in a large majority the cases. Certain variations from the above standard or typical urse are frequently, however, met with, and require some notice. ese variations may consist merely in the degree of severity of the al and general symptoms, or in the appearances presented by the ck, without affecting at all the validity of the disease; or they may ncern the duration of the phenomena; or, lastly, they may be such to call in question the validity of the disease, leaving us in some doubt to whether it has protected the constitution against variolous attacks not.

The severity of the local inflammation occasioned by the vaccination, l that of the general symptoms also, varies often to a considerable ent. In some instances, and especially when the virus employed been procured recently from the cow, the specific inflammation ves very severe. We have seen the arm intensely red, and very siderably swelled, from the shoulder to an inch below the elbow, ile at the same time the axillary glands were tumefied and tender, l the child very feverish and uncomfortable. This happened in ee children, in all of whom we had employed the same virus; ich, as we afterwards learned of the person from whom we obtained had been taken quite recently from the cow. It produced the same lent inflammation, moreover, in several other subjects in whom it s employed.

f the vesicle happens to be broken by accident soon after its forma- n, its appearances during the subsequent progress of the disorder l often be very different from those exhibited in subjects in whom no h accident occurs. The vesicle loses a portion of its contents; it omes conoidal and irregular in shape, instead of being circular and bilicated; it does not exhibit the pearly white and diaphanous color ich belongs to it, but is yellowish and opaque; the areola is often mature and irregular in shape, and the scab is frequently small, un- n on the edges, and falls off at an unusually early period.

Occasionally there is observed in the course of cow-pox a papular ption over the body of the child. This occurs usually between the th and twelfth days.

, and will be described in the article on revaccination. Whenever, vever, the disease fails, in any important respect, to exhibit the per- t attributes of a well-marked pock, both as regards its time of devel- nent, its changes, and its particular appearances at each stage, in a ld not previously vaccinated, nor having had small-pox, the only e and prudent plan to follow is to repeat the operation a few weeks er the doubtful one, so as to test thereby the protective power of first.

ROTECTIVE POWERS.—Though vaccination in infancy has not proved vereign protection against small-pox, as was at first hoped and ex- ted, the security it does afford, when properly used, against one of most loathsome and dangerous of diseases, is so nearly perfect that thought of its benevolent power ought to rouse every feeling of nkfulness of which the human heart is capable. It has come to s within a few years, here and there in the world, and we know s was the case in Philadelphia, that some persons have begun to stion the real value of vaccination. Such persons always seemed to the most crotchety and foolish of mankind, and since small-pox ex- ited its powers here, as it did in the epidemic of 1871–2, we imagine se very persons are quite ready once again to thank Providence for great boon, and to do true homage to the great discoverers of vacci- ion.

s to the protective powers of vaccination, we have had proof abun- t, in our own experience alone, to satisfy us that this is complete en it is properly applied. We have never seen life lost or the face figured, during thirty-two years of experience, in any one who had n well vaccinated in infancy, and then *successfully* revaccinated at erty. We had never seen a fatal case of small-pox in a subject ler 43 years of age, who had been well vaccinated in infancy, until late epidemic, though we had seen two who had it severely enough pock-mark them. We knew that such cases occurred, but none had urred in our own practice; and our experience in the late terrible epi- nic has but confirmed our faith in the powers of vaccination. During prevalence we saw no severe nor dangerous varioloid or variola in ldren under 10 and 12 years of age. It was not except among those er 15 and 20 years of age that we began to see and hear of dangerous es of the disease; and after successful revaccination, even in those st exposed, we saw not a case even of varioloid, much less of severe iola. We could, had we the space, cite particular instances in our n practice in proof of the absolute protection afforded by revaccina- n, but deem it best to give some facts illustrative of this power from hospital experiences of the late epidemic.

n the report made to the Board of Health, of this city, by Dr. Welch, the Municipal Hospital, during the epidemic of 1871–2, are some facts ich show most strikingly the power of vaccination. At page 9 are en the following cases:

'Case 1. Child, aged two years; vaccinated in infancy; two good

"No. X. Child, æt. 8 years; vaccinated six months ag
eleven (11) days in hospital; no disease."

At page 12 Dr. Welch states another very interesting
incides with the experience of the London Small-pox
says: "In this connection we might add that the phys
his two assistants, the matron—who has been connecte
pital for twenty-four years—the chief male nurse, an
others employed at the hospital during the epidemic,
only by vaccination and revaccination. Indeed, not
connected with the hospital, who had been revaccina
the disease; while, on the other hand, some three or fou
who had been affected by small-pox previously, took th
ond time."

How any one can read such facts as these, and they
nitely increased, and yet refuse a child the boon of vac
yond our comprehension.

In the last edition of this work we endeavored to sho
and propriety of revaccination. Hereafter we shall ad
nation in all cases, no matter how perfect the first vacc
stated to have been, or how perfect the cicatrix or cic
age of fifteen, or as soon afterwards as possible, all youn
to be revaccinated. There should be no waiting for an
direct exposure to infection. The operation ought to
regularly as the primary vaccination.

There is now a host of evidence on this point, but tha
by Dr. Welch, in the report just quoted, of facts demo
late epidemic in this city will be all-sufficient.

"With reference to the practical efficacy of revaccin

d fair cicatrices; and only three (3) were able to show good cica-
s.

)f the four (4) who died, two (2) occurred among those without
rices, one among those revaccinated after exposure, and one among
e showing poor and uncharacteristic scars.

\ll the cases which bore upon their arms unmistakable evidence of
essful revaccination, suffered from the mildest form possible of the
ise. Indeed, three (3) of these cases exhibited an eruption of doubt-
haracter, and have therefore been recorded as cases of varioloid (?).
eruption on three (3) others did not advance beyond the papular
e, and on seven (7) it was barely vesicular."

is unnecessary to add anything more as to the protective power
e vaccine disease against small-pox. Those who are not convinced
uch facts as these, would not believe one though he rose from the
l.

ERIOD OF PERFORMANCE.—The period usually chosen for the per-
iance of this operation, is soon after the age of three months. If,
ever, the infant be exposed to the contagion of variola, it is neces-
to perform it immediately, even upon the first day of life; and in
cases the protective power is as perfect, and the local or constitu-
l irritation little greater, than when the operation has been de-
d to the usual time.

SCEPTIBILITY TO THE DISEASE.—The susceptibility to the vaccine
ise varies greatly in different persons and different families, and is
ified to a greater or less extent by the existence of other diseases
e individual at the moment of the operation. In some it is said
r to be received, no matter how frequently or how carefully the
may be inserted. In others it is received with difficulty, requir-
everal repetitions of the operation before it can be made to take;
st in yet another class of subjects, the smallest amount of virus,
n inserted in a careless and imperfect manner even, will produce
lisease with the greatest certainty. Nevertheless a large majority
ildren take the disease after a single operation, if this be performed
ordinary care and nicety. No explanation of the different sus-
ibilities of individuals to the disease can be given. The same dif-
ice is known to exist in regard to other contagious and even epi-
c diseases, as measles, scarlatina, pertussis, variola itself, typhoid
, and cholera.

ie susceptibility varies also in the same person at different times,
out its being possible to ascribe this fact to any evident cause, since
child may appear on both occasions to be in the same condition as
alth and other circumstances likely to influence its susceptibility
e contagion. Thus, we knew a child a few months old to be vac-
ed four times, twice by the late Dr. C. D. Meigs and twice by one
rselves, each operation following rapidly the preceding one, with-
uccess, though the virus was known to be good from its having suc-
ed in other subjects, and though it was changed each time. The
appeared to be in perfect health. There was no eruption of any

kind upon its surface, nor any other condition that could explain its insusceptibility. After the fourth operation, the attempt was suspended for about four months, then renewed, and with instant and entire success. In another case, the varying susceptibility of the same individual to the disease was still more strikingly exemplified. An infant, a few months old, was vaccinated four times in succession from the scab without success. It was then vaccinated with fresh lymph taken from the arm of an infant who was undergoing the disease. This also failed. A few weeks after this, the operation was again performed with the dried scab, and this time with perfect success.

Certain eruptions existing previously upon the surface, have seemed to us to prevent the reception of a vaccination. The eczematous and impetiginous diseases of infancy and childhood have certainly had this effect in our experience, though M. Taupin (*Dict. de Médecine*, t. xxx, p. 406) is of the contrary opinion; he having found that the disease has been merely retarded when the operation was performed during the initial stage of the eruptive fevers, whilst its course was suspended even entirely when any of these affections occurred in a child already vaccinated, to be resumed again after the cure of the eruptive fever.

There is another circumstance concerning the supposed effects of other diseases on the vaccine affection, to which it will be well to draw attention. We are sure there are few practitioners, having any considerable amount of business, but must have been annoyed, and injured perhaps in their reputations, by the notion so prevalent in the community that vaccination may impart to children other diseases. This prejudice exists particularly in regard to the chronic cutaneous eruptions of infancy and childhood, so that we have frequently had parents to insist to us that the impetiginous or eczematous disease under which their child might be laboring, has been caused by the vaccination, performed perhaps recently, or even months before. M. Taupin, quoted by MM. Guersant and Blache (*Dict. de Méd.*, t. xxx, p. 414), vaccinated a large number of children at the Children's Hospital in Paris, with virus taken from subjects affected with itch, scarlatina, measles, varicella, varioloid and variola, rachitis, scrofula, tuberculosis, chronic eruptions of the scalp, dartres, &c., without communicating to the patient any of these affections, either those of acknowledged contagious or non-contagious nature. A very curious case illustrative of this point is mentioned by Dr. Gregory in his "*Lectures on the Eruptive Fevers*" (Am. ed., New York, p. 270). "A child, who had been exposed to the infection of small-pox, was vaccinated. Both diseases advanced. A lancet charged with lymph from the vaccine vesicle produced cow-pox. Another lancet charged with matter from a *variolous* pustule, *formed within the vaccine areola*, communicated small-pox." We mention the result of these experiments in order to show how little foundation there is for the popular notion above alluded to, and to give to the practitioner an argument with which to defend himself against the unjust accusations of those who may assert his vaccination to have been the cause of any disorder that may have followed upon it. Not that we would ourselves employ virus taken

n a child suffering from disease of any kind whatsoever, since this
to say the least, unnecessary, and ought to be avoided. Indeed, we
e never employed a vaccine crust taken from a child who was not
arently in perfect health. The smallest amount of cutaneous erup-
upon a child has always been sufficient reason with us to reject the
us afforded by such a patient, and as this *must* be the safest plan to
pt, it is of course the proper one.

The still more serious charge has, of recent years, been made against
cination, that it may be the means of transmitting constitutional
hilis. And there are well-authenticated cases in which the opera-
has undoubtedly been followed by this terrible result. In every
tance, however, so far as we are aware, in which the exact mode of
vaccination could be ascertained, it has been found either that the
ld from whom the virus was obtained, presented at the time evidences
constitutional syphilis, or that the virus had been impure, being
xed with blood or pus, which may have been the medium of infection.
ere is, indeed, no evidence whatever to show that the lymph or crust
ived from a typical vaccine eruption, in an apparently healthy child,
possibly be the means of transmitting any constitutional disease.
is more prudent, however, that if the lymph be used, it should not
taken after the eighth day of the existence of the vesicles; and that
obtaining it, all hemorrhage should be avoided.

Mr. Jonathan Hutchinson (*Med.-Chirurg. Transactions*, for 1871) gives
o series of cases which show the possibility of communicating syph-
by means of vaccination. At page 322 he states his belief that the
od is the source of the contamination. He says: "There can, I
nk, be little doubt that in this instance it was the blood, and not the
ccine lymph, which was the source of contamination." At page 325
quotes, from a previous report, the following, amongst other conclu-
ns: "That the blood of a child suffering from inherited syphilis can,
inoculated, transmit the disease with great certainty.

"That it is quite possible for vaccine lymph and blood to be trans-
red at the same time, and for each to produce its specific results, the
ects of the syphilitic inoculation occurring subsequently to those of
ccination.

"That it is quite possible to vaccinate successfully from a syphilitic
fant in the stage of the utmost potency as regards its blood, without
mmunicating syphilis."

In regard to this most important point we have two statements to
ake: that we have never had occasion to suspect even that we have
en the unfortunate instruments in communicating this disease in our
n practice, and that we have always used the dried scab. Is this
ppy exemption from such an accident the result of care in selecting
e virus, or does it depend on our constant use of the dried scab? Is
t the danger of having blood intermixed with the lymph much greater,
hen the vesicle is opened by the surgeon on the eighth day, than when
e lymph is left to dry and form a scab in the natural mode?

Operation.—Under this head we shall consider several important points: the relative value of the dried scab and fresh lymph; the question as to whether it is best to raise more than one vesicle by more than one insertion of the virus; and the various modes of performing the operation.

In this city it has been the custom for many years past to use the dried scab, and to raise, as a rule, but one vesicle. After an experience, extending, in the case of one of us, over thirty-two years, during which we have never used anything but the crust, and have rarely made more than one insertion, we can aver that we have never known any one to die of small-pox who had been successfully vaccinated and then successfully revaccinated by this method. We have seen a good many mild varioloids, in subjects that had not been revaccinated, from the ages of twelve and fifteen upwards, but only in two cases have we known the disease to be severe enough to pock-mark the patient. We know of but one death from small-pox in our own circle of patients. This occurred in a gentleman 43 years of age, who was originally vaccinated by the late Dr. C. D. Meigs, and who was never revaccinated until four or five days after he had been exposed directly to the small-pox infection. The operation came too late. Though the puncture took, he died of hemorrhagic small-pox of a virulent form.

In using the crust we have always taken great care to select only those from the most healthy children. Any blemish upon the skin, any shadow of doubt as to the perfection of the vaccine disease, ought always to cause the rejection of the crust.

In our remarks upon the possibility of the conveyance of the syphilitic poison by vaccination, we cited Mr. Hutchinson's opinion that the agent of communication is the blood of the vaccinifer, and not the lymph of the vaccine vesicle. We have never known a case of such conveyance in our own practice, nor in that of our various medical friends in this city. Can this exemption depend upon the use of the dried lymph, whereby the chance of having blood intermixed with the lymph is lessened?

The scab is less certain to take the first time than the fresh lymph, but it can always be made to take by perseverance, and we confess that it is hard for us to understand why the vaccine disease, if it be perfect in all its stages and phenomena, is not as much a vaccine disease when it springs from the crust as when it proceeds from fresh lymph, and therefore as competent to affect the economy through which it passes according to its natural law.

If the crust is to be used, it ought to be as fresh as possible, to insure its taking at the first operation. When the physician is obliged to keep it for several weeks, he should preserve it in some close receptacle, as between glasses, in tin-foil, oiled paper, between two pieces of wax, or in hermetically closed glass vials.

If the fresh lymph is preferred, the children to be vaccinated should be collected together about the vaccinifer (the child from whom it is to be taken) on the eighth day of the disease. The vesicle must be very carefully opened, so as to avoid wounding the true derm, and thereby sing any effusion of blood, and the lymph conveyed on a lancet di- tly from arm to arm.

t is proper to say that this is the mode of vaccinating usually pre- red in Europe as the most certain and successful.

Though we have stated that, in our own practice in this city, one roughly characteristic vesicle at the primary vaccination, and one in at the revaccination, has been entirely successful in securing com- te protection against small-pox, the opinion is held abroad that more n one vesicle gives greater security, in the event of small-pox attack- the vaccinated, than a single one. This opinion, which is based upon y numerous observations in England and Germany, is so strong and itive that we think it best to advise hereafter that at least two in- tions, so as to raise two vesicles, shall be made in this country. y one who wishes to study this question may refer to an excellent icle on Vaccination, by Dr. Edward Cator Seaton, in *Reynolds's System Medicine*, vol. i, page 483, where the whole subject is fully discussed. page 499 Dr. Seaton insists that it is the duty of the physician to duce four or five genuine, good-sized vesicles.[1]

t is proper to put before the reader this opinion of so able an au- rity as Dr. Seaton, so that any one who feels bound by such author- may follow his rule. For ourselves, we can only repeat that thus in our own experience, one thoroughly good primary vaccination, a second characteristic vesicle obtained at the revaccination, have n entirely successful and sufficient. In obedience, however, to the ts collected in England and Germany, we shall hereafter, as stated ve, advise the raising of at least two good vesicles at each vaccina- n. It makes but little difference whether the two be raised on one n, or one on each. For the convenience of handling the child, we nk it will be best to make the two insertions on one arm.

We think it the duty of the physician who vaccinates a child always

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The protective power of vaccination, as well as the influence exerted by the per- ion and the number of the insertions, as shown by the cicatrices, is remarkably l exhibited in the following table quoted by Dr. Seaton (Art. Vaccination, in Rey- ds's Syst. of Med., vol. i, p. 499), from Mr. Marson. The table is based upon 00 cases. Of these it was found that the unvaccinated died at the rate of 37 per t., and the vaccinated at the rate of only 6½ per cent.

Classification of Patients affected with Small-pox.	Number of Deaths, per cent. in each class respectively.
1. Unvaccinated,	37.
2. Stated to have been vaccinated, but having no cicatrix,	23.57
3. Vaccinated.	
a. Having one vaccine cicatrix,	7.73
b. Having two vaccine cicatrices,	4.70
c. Having three " "	1.95
d. Having four or more vaccine cicatrices,	0.55
α. Having well-marked cicatrices,	2.52
β. Having badly-marked "	8.82
4. Having previously had small-pox,	19.

to see to it himself that the result is a perfect vaccine disease. This matter is too important to be trusted to any inexperienced person. The physician has not done his duty who trusts to anything but his own eye as to the genuineness of the vesicle which results from his operation. He should examine it himself on the eighth or ninth day of the disease. The special characters of the disease have already been fully described.

It would be well, too, that physicians in charge of families should examine the cicatrices which follow vaccination, and if they fail to present the characters which belong to successful operations, he ought to repeat the vaccination. Dr. Welch, whose experience in this matter was large, says that a good cicatrix is one "with a well-defined margin, slightly excavated, and reticulated or honeycombed." What he classifies as a fair cicatrix presents the same characteristics, but to a less marked degree, and poor ones are those "pointed out as the result of vaccination, but which are so indistinct or uncharacteristic as to make it difficult, and sometimes even impossible, to recognize them as vaccine scars." In case any practitioner should meet with the latter in a family he may be attending, he ought, we think, to urge upon the parents the necessity of repeating the operation at once.

Revaccination.—We think few physicians or laymen who watched the violent epidemic of small-pox which prevailed in this city during 1871 and 1872, can doubt as to the necessity of revaccination. So convinced are we by what we saw during that epidemic of this necessity, that we shall, hereafter, advocate the repetition of the operation at the age of puberty as a matter of domestic habit and law, a matter to be attended to by the heads of families with the same regularity and care that is now universally bestowed by all educated and careful people upon the vaccination of infants. Each child of a family ought to be subjected to this operation at or about the age of fifteen, and we think the family physician ought to bestow the same care upon this as upon the primary vaccination. One trial, without result, we hold to be of no more use than it would be in an unvaccinated child. The trial should be made again and again until a result is obtained. We have ourselves of late years repeated it twice, three times, and, in one instance, seven times, before we succeeded in obtaining a vesicle. Once the vesicle obtained, with a good areola, we believe the subject is safe for many years, probably for the lifetime.

The characters of the vaccine disease produced by a revaccination are not always the same as those obtained at the primary vaccination, especially when the time between the two operations is only that extending from birth to puberty. We have seen at later periods of life, at thirty and forty years of age, for instance, as perfect specimens of the vaccine disease from a secondary vaccination as we have ever seen in the infant. Not a feature has been wanting. The exact phases of the disease, the papule, the vesicle, the precise duration as to time, the areola, the constitutional disturbance, and the resulting cicatrix, have all been perfect in every point.

ficult to escape the conviction that in such cases as these just
the protective power of the primary vaccination had been
bliterated, and such, indeed, is and has been the opinion of
careful observation has shown, however, that this is not
d that, to use the words of Dr. Seaton (*loc. cit.*, p. 511), we
draw from the local phenomena of revaccination any infer-
tever as to the state in which the revaccinated person was
lity to small-pox. Jenner himself, indeed, pointed this out in
eatise, and showed that the natural cow-pox might be in-
in and again in persons who, being protected against variola
rst attack of cow pox, could not be variolated either by inoc-
by exposure, as well as that cow-pox might be made to take
who had had small-pox." A table, given by Dr. Seaton to
results of revaccination in the Würtemburg army in 1831–35,
English army in 1861, shows conclusively that revaccination
y as successful in producing a perfect vaccine disease in those
the marks of previous small-pox, and in those who had good
of previous vaccinations, as in those who bore no marks of
accination or small-pox.

acts overthrow the prevalent notion held by the public at
by many physicians, that a successful revaccination is a sure
the subject had lost the protection afforded by the previous
n. They also overthrow the idea that it is necessary to re-
every few years in order to renew the protective power of
e disease. One good primary vaccination doubtless affords
tion throughout life in many, but it does not in all, and since
ssible to determine which are the protected and which the
ed, it is necessary to revaccinate all. But one successful re-
n is probably all that is required. Should, however, any one
een thus successfully revaccinated be exposed directly to the
f small-pox many years afterwards, it might be well to repeat
tion once again. The fashion, however, of being revaccinated
years, which some persons indulge in and some physicians
only too readily, is simply a work of foolish supererogation
ended with risk, since vaccine punctures, though made in the
imate way, will occasionally cause severe and even danger-

e already said that revaccination at puberty rarely produces
disease of typical character. Still more is this true of chil-
r puberty. At that early age the disease usually begins ear-
the puncture than in the primary form, reaches its height by
r sixth day, and then declines. The vesicle is apt to be acu-
ather than umbilicated, the areola is irregular in outline, nar-
ler, and is usually hard. The scab is small and imperfect,
ore like one formed by the desiccation of pus than like that
om true vaccine lymph, and it is often complete by the eighth
soon falls. There is often a good deal of constitutional irrita-
ed by revaccination, more even than in the primary disease,

years small-pox had prevailed in 344 localities, produci
modified and unmodified small-pox among the not reva
part not vaccinated, population of 363,298 persons in
which it had prevailed. In the Prussian army, since t
of systematic revaccination of all, the annual deaths
(which at one time were 104) have not averaged more
analysis of 40 fatal cases that occurred in twenty ye
that only 4 were in persons who were said to have be
revaccinated."

He also cites Mr. Marson's statement to the effect
years no nurse or servant at the Small-pox Hospital h
pox, he having taken care always to revaccinate them
to live in the hospital; and further, that when a large n
people were employed for several months about the h
whom consented to be revaccinated, two only were att
pox, but they were amongst the few who were not rev

With a few words on the mode of performing the op
nation, we shall bring this article to a close.

Different methods of inserting the vaccine virus have
by different practitioners. The two methods most freq
to are those by incision and puncture. The former con
a superficial incision of several lines in length into the
way as to cause a very slight effusion of blood. Into th
a small quantity of a dried vaccine scab reduced to a fi
piece of fine thread wet with the vaccine fluid or with
in suspension a portion of dried virus. Over the woun
a piece of isinglass plaster, which is secured by a band
be removed after two or three days, and the disease all

child with our left hand, and stretching the skin between er and thumb, whilst the under part of the arm is grasped id finger placed beneath the first, we lay the lancet flat cin, and using the point, remove, by a repeated and very ng movement, the cuticle, until the surface of the derm is as to allow of a perceptible, and merely perceptible oozing in other words, so as to expose a living surface. This surbe about as large as a small-sized bird-shot, and it should it merely show that the vascular part of the derm has been slightly exposed. On this surface the vaccine fluid or disis to be placed in quantity sufficient to cover it, and the l be told to leave the arm bare and untouched for twenty until the applied fluid has dried into a little scab, when no autions are necessary. This mode of operating may at first s and painful. We can only say that when performed gradually, it causes so little pain that we have often prac- sleeping children without waking them.

usually selected for the operation is, as every one knows, close to the insertion of the deltoid muscle. This is the s a general rule, and particularly in girls, whose parents to having the insertion made below this, lest the scar sible in after years, when the arm is uncovered. In boys ect the radial edge of the forearm some two inches below ince in this place the pock is least apt to be injured in the ng the child, or of lifting it about.

ARTICLE IX.

VARICELLA.

n; Synonyms; Forms.—Varicella is a contagious eruptive nign nature, characterized by more or less numerous transles following rapidly upon small red elevations. The eruply preceded by slight initial symptoms lasting from one to id it terminates by the desiccation of the vesicles about the th day after their appearance.

n also in English by the names of chicken-pox, swine-pox, i.

fferent forms of the disease have been described by different er the titles of lenticular, conoidal, and globular; but inasse varieties are of no real importance in practice, we shall rt to them casually in our account of the eruption.

Varicella is propagated in two ways; by *contagion*, and by uence. That it is contagious there can be no doubt, since acuminated, constituting the *lenticular* form of the disease, or they y be larger and of a more globular shape, constituting the *conoidal* l *globular* or *globose* forms of Willan and Bateman. We deem it ecessary, as above stated, to describe different varieties of varicella, ce this is useless for any practical purposes, and because we constantly upon the same subject vesicles of very different shape and size. ien fully completed, the vesicles are often of very considerable size— or three lines in diameter; they contain a transparent fluid, ich is either entirely colorless or of a faint orange tint, and some of m are surrounded by a small ring of inflammation. On the third , the eruption continues in nearly the same state as on the second, ept that the fluid contained within the vesicles assumes a yellowish earance, owing to its passage from the serous into the purulent con- ion. On the fourth day, the process of desiccation begins and goes rapidly, the vesicles that have not been broken by accident, or torn the fingers of the child in its efforts to appease the itching which y give rise to, assuming a shrivelled and shrunken appearance at ir margins. As this process goes on, the vesicles are gradually con- ted into light brownish scabs, so that by the sixth day they are rly all dried up. The scabs are usually thin; they dry from the cumference to the centre, and between the eighth and ninth days fall , leaving behind faint red spots, not depressed below the general sur- e, and which soon disappear.

The eruption is generally accompanied, as was stated above, by a sation of heat and itching in the vesicles, which causes the child to b and scratch them in such a way as often to break those which he reach, and thus prevent them from passing through the regular riods of maturation and desiccation.

DIAGNOSIS.—There is but one disease with which varicella could be nfounded, and that is variola in some of its shapes. With regular all-pox such a mistake could scarcely happen even to the inexperi- ced. With varioloid, on the contrary, there might be some difficulty, d yet, if it is borne in mind that in varioloid the initiatory fever is uch more severe, lasting three days instead of twelve or thirty-six urs, that the eruption appears first on the face and extends very owly to the trunk and extremities, and that the conversion from the pular into the vesicular condition is much more gradual than in icken-pox, we think no serious difficulty can ever occur in making e distinction between the two affections.

PROGNOSIS.—The prognosis is always favorable. The only real ouble that we have ever known to occur has been from catarrh or eumonia contracted by imprudent exposure during the convalescence.

TREATMENT.—In a large majority of the cases, varicella requires no atment beyond attention to diet for the first two or three days, and avoidance of cold during the convalescence. When the constitu- nal symptoms are marked, the fever and headache being consider- e, a dose of some mild cathartic, a little sweet spirit of nitre in cold lemonade or orangeade, rest in bed, and one or two foot-baths, will be all that is necessary to reduce these symptoms and make the patient comfortable.

ARTICLE X.

TYPHOID FEVER.

It is only of late years that the frequent occurrence of typhoid fever in young children has been fully recognized by medical authors. From the date of the publication of the classical work of Louis on this disease, until the year 1839, it appears to have been the almost universal belief that it was an affection limited to adult life; and with the exception of a few brief and vague descriptions, which evidently referred to this disease, though other names were used to designate it, medical literature contained no account of typhoid fever as it occurs in childhood. In the latter part of 1839, however, Rilliet (*Thèse de la Faculté*, 1840; and *Maladies des Enfants*, t. ii, pp. 663–739) and Taupin (*Journal des Connaissances Méd.-Chirurgicales*) published separate and independent memoirs on this subject; and since that time the occurrence of typhoid fever in children has been frequently observed and very carefully studied.

The fact that it was so long overlooked, is undoubtedly to be explained, in great part, by certain peculiarities which the disease presents in children, which caused its real nature to be mistaken, and led to the application of other names.

Of these names, that of infantile remittent fever was the most frequently used, and though this term was made to include a number of other diseases, and although remittent fever does occur in children, there can now be no doubt that a large proportion of the cases so styled, were in reality cases of typhoid fever.

Causes.—*Age.*—Typhoid fever has been observed during the first year of life, but is rare under the age of two years. We have however met with well-marked instances of it at the age of eighteen or twenty months. It is comparatively frequent between the ages of three and eight years, and it attains its maximum of frequency in childhood between the ages of eight and eleven years.

Sex.—The statistics of most authorities show a preponderance, more or less marked, of cases occurring in boys. In some series of cases this disparity has been remarkable (three to one); but, notwithstanding, it is probable that in a very extensive series the difference would be comparatively trifling.

Contagion.—It can scarcely be doubted that typhoid fever is occasionally transmitted by contagion, but the degree of its contagiousness is extremely slight. On the other hand, it is subject both to epidemic nd endemic influences in a marked degree; and it is owing to the arying action of these causes that it presents the wide variety, in type nd severity, which will be described.

ANATOMICAL APPEARANCES.—These are strictly analogous to those und in the adult. When death occurs early in the attack, the agmi-ate glands of the ileum are found swollen, prominent, injected; the teration being most marked in those nearest to the ileo-cœcal valve. ater, however, these glands ulcerate, the softening beginning either the surface, and extending more and more deeply, or beginning in e deeper portion of the patch, so that the superficial layer may be rown off as a slough.

These ulcers thus destroy the mucous membrane, and present the bmucous or muscular coats for their base; or, in some instances, the cerative process may extend through the muscular and even through e peritoneal coats.

According to Rilliet (*loc. cit.*), however, these ulcers are more slow in rming, smaller, and less numerous and deep in children than in adults; nd, indeed, he believes that in not a few instances the swelling and in-ammation of the gland may undergo resolution without the occurrence f ulceration.

Too much importance must not, however, be attached to this state-ent, since it appears to us evident that a few cases, at least, of typhus ever are included amongst those upon which his memoir is based.

The solitary glands are, in the early stage of the disease, prominent, nd may be distended with a serous or more thick and yellowish secre-ion, so as to resemble vesicles or even pustules. Later in the attack heir mucous covering is destroyed, and small, round, or oval ulcers, ith everted edges, remain. These ulcers are also most numerous in he lower part of the ileum, though in some cases they are met with uite abundantly in the large intestine.

The mesenteric glands are enlarged, softened, and strongly injected, he change corresponding in intensity to that of the agminate glands n the ileum, and being most marked in those glands which are nearest he ileo-cœcal valve. Usually the swelling of these glands subsides without suppuration occurring, but occasionally this ensues, and the gland is converted into an abscess with thin walls.

The cicatrization of the intestinal ulcers appears usually to occur apidly; thus, Rilliet has seen the process completed by the thirtieth ay, though this is probably sooner than it is entirely finished in the majority of cases..

Ulcers of other mucous surfaces, as of the pharynx and larynx, are ore rarely met with in children than in adults. The spleen is nearly lways considerably enlarged and softened.

The blood in severe cases is dark and uncoagulable, and the lining embrane of the heart and large vessels is stained by imbibition. In ome cases quite firm coagula are met with in the cavities of the heart.

Even in cases where the most violent nervous symptoms have been resent, the brain rarely presents any more positive lesion than mere

cely, if at all, elevated above the surface, of a light rose color, dis-
aring on very slight pressure, and quite rapidly returning.

uring the second week, the symptoms become more severe. The
r is more continuous, and the temperature ranges in different cases
n 102° to 105°; it may still present, however, decided morning re-
sions, and it is not rare for profuse warm perspiration to occur, with-
having any critical value whatever. The pulse becomes more fre-
nt, 120, 140, even 160, and at the same time smaller and of less force.
respirations are also more hurried, and, when the pulmonary com-
ation is marked, may be very rapid and shallow, and the cough fre-
nt and annoying; in such cases, auscultation reveals, especially over
postero-inferior part of the lungs, abundant mucous, or subcrepitant
s. The vomiting ceases, and the child will usually take the liquid
offered it; the tongue becomes more heavily furred, and may be
and brownish in the centre, though it often remains moist and yel-
sh-white throughout. Thirst is apt to diminish, owing to dulness
e perceptions, but the child will frequently drink greedily of cold
er if offered to it. The diarrhœa persists, however, and the stools
ochre yellow and fluid; the belly is more tympanitic, and may be
emely distended. The discharges, both of urine and fæces, are often
luntary, and the child does not even appear conscious of them.
urine is high-colored and scanty. The eruption continues and be-
es more abundant, the spots which appeared passing away and
g followed by successive crops. Sudamina are also frequently pres-
especially when sweating occurs. The mind becomes more and
e dull, though it is nearly always possible to rouse the child by
king loudly to it; delirium is usually present, especially in the
t, and manifests itself in young children by restlessness, sharp, un-
ning cries, and a wild expression of the face, and in older ones by
tering, or even by attempts to leave the bed. Irregular muscular
ements, such as floccitatio and subsultus, are rarely noticed; though
imes these, and even spasmodic rigidity of the trunk or limbs, or
vulsions, may be present.

e have thus sketched the course of what is, perhaps, the most com-
form of typhoid fever in children, where the disease begins gradu-
, and either remains mild throughout, or assumes a more grave
racter during the second week.

n a certain number of cases, however, the onset of the disease is far
re sudden and violent, and the severity of the attack is manifested
n its earliest period. In this form, the prodromes are brief, or almost
irely absent; and there may be in older children an initial chill, or
only symptoms present are marked debility, languor, and drowsi-
s. During even the first two or three days, however, there is apt
to be frequent vomiting, severe headache, or marked hebetude, and
h fever, which usually presents the same marked morning remis-
ns and evening exacerbations as in the milder form. The sleep is
tless and disturbed, and the child either utters sharp cries, or, if older,
s incoherently. The pulse and respiration are much accelerated,

The pulse is very frequent and feeble, and the breath
and usually accompanied with bronchial râles. The
but the abdomen becomes tympanitic, and there is mo
dant diarrhœa; the stools are often passed quite involu
urine is either retained or dribbles away unconsciously
curs in a large proportion of cases, and about this tim
istic rose-colored eruption makes its appearance. Du
week, all of the symptoms become more grave, and the
cumb to the violence of the disease, or remain for a w
plunged in profound stupor, with subsultus and marke
mor; with the lips and teeth coated with sordes, the
lous, dry, and coated with brown crusts, the abdomen
the stools frequent, thin, and passed involuntarily; wit
ning, feeble, from 130 to 160 in the minute; the respi
imperfect, and attended with subcrepitant râles, indicat
gestion of the lungs; with the urine retained, dark-co
albuminous; and yet gradually emerge from this app
condition to enter upon convalescence about the cl
week.

In favorable cases, between the fifteenth and twen
grave symptoms begin to abate. The child's expressio
natural, and often the earliest sign of approaching co
be the appearance of a smile of recognition, or of pleas
sciousness of improvement. The fur upon the tongue
moister, and begins to separate, and the appetite slow
distension of the abdomen diminishes, and the stools a
consciously and voluntarily, and gradually assume a hea
Restlessness and delirium disappear, and the sleep be

ended with marked nervous symptoms, characteristic eruption, and
rrhœa, may ensue.

n very severe cases, on the contrary, and especially when a fatal re-
t is to follow, the condition of the patient grows more and more
ve after the end of the second week, unless, as at times happens,
th has occurred sooner from the violence or malignancy of the at-
k. The nervous symptoms become more marked, and the child sinks
o a deeper stupor, even approaching true coma, or the stupor is in-
rupted by violent agitation, with cries or efforts to leave the bed,
by muscular twitchings, picking at the bed-clothes, or even general
vulsions. The pulse is very rapid and small; the respirations hur-
d and noisy, and physical examination frequently reveals the exist-
ce of extensive bronchitis or hypostatic pneumonia. Vomiting is
ely present, but hiccup may be frequent and distressing; the belly
enormously distended, the stools frequent, involuntary, and at times
ody. Bed-sores form on points subjected to pressure, and death en-
s amid profound stupor and with signs of extreme pulmonary ob-
uction.

At other times death occurs not so much from the extreme violence
the disease itself as from the development of some one of the com-
cations which will be mentioned hereafter.

Special Symptoms.—Although, as has been seen, the general course
typhoid fever is much the same in children as in adults, there are a
v symptoms which require more detailed notice, as presenting pecu-
rities which impress special features upon the disease as it occurs in
ildhood.

Prodromes.—In children, as in adults, typhoid fever is nearly always
eceded by a marked prodromic stage, and the passage from the state
health to the fully developed disease is usually very gradual. The
ration of these prodromes varies from three or four to ten days, being
st in the more severe cases.

Fever.—Condition of Skin.—We have already remarked that, in the
rly stage, there are apt to be very marked remissions in the febrile
tion, lasting even throughout a considerable part of the day; the
acerbations of the fever usually occurring towards evening. West
ates that in some few instances two distinct remissions and exacer-
tions may be noticed in the course of every twenty-four hours. It
this feature which gained for the disease the name of infantile remit-
nt fever, and caused it to be ranked formerly with the malarial diseases.
wards the middle of the second week, however, the remissions become
uch less marked; the temperature, which in some cases reaches 104°
105°, merely presenting a somewhat marked fall in the morning.
e skin is hot and dry as a general rule, but sweats are more apt to
cur during the height of the disease than they are in adults; they
not, however, of any prognostic value.

Digestive Symptoms.—Among the earliest and most important symp-
ns are various disturbances of the digestive functions. The appetite
idly fails, and is often lost before the attack fairly begins. Thirst

some cases, however, and especially those where vomi
constipation of a quite obstinate form is present. Th
these two symptoms, in connection with the cerebral sy
may cause the case to strongly resemble the first stag
meningitis; the doubt may, however, be usually reso
examination, as will be more fully alluded to under t
nosis.

The stools, when diarrhœa exists, are ochre-color
standing, deposit a sediment of shreds of mucous memb
and partially digested food. Mucus is rarely presen
varying amount, may be mixed with the fecal mat
amount is large, it is usually due to the ulcerative pro
tine having opened a vessel of considerable size, and th
very grave complication.

In young children it is difficult to establish the exist
nal pain, but, when they are capable of describing thei
icky pain is frequently complained of in the early stag
the youngest children, pressure in the right iliac regio
seen to be painful.

Tympany is usually present at some time during t
cially when there is diarrhœa. Even when the bow
however, the abdomen is never retracted. Rilliet stat
grave cases, he observed such great tympany that the
were thin enough to allow the outlines of the convol
testine to be clearly seen.

Enlargement of the spleen nearly always exists, but
slight a degree that it cannot be readily detected eithe
percussion, and even when considerably enlarged, it is
hidden by the distension of the abdomen.

The *urine* presents the ordinary febrile conditions, be cases, which may ultimately recover, retention of urine is present, is of grave import. Rilliet never observed this symptom, but we e seen it more than once, and especially in a boy aged five years, required catheterization for several days successively, but who lly recovered.

espiratory and Circulatory Symptoms.—Even during the first week, re is usually more or less dry cough, with sonorous and sibilant râles r the posterior part of the lungs. Indeed, in some cases, we have wn the cough and signs of catarrhal inflammation to be so marked he first days of the disease, as to cause the attack to be regarded one of severe acute bronchitis. Later in the disease, and owing rely to the passive hypostatic congestion of the lungs, and the accu- lation of mucus in the bronchial tubes, the cough is apt to grow more uent and troublesome, the respiration is hurried and oppressed, and cultation reveals moist and dry râles throughout both lungs. When umonia or bronchitis supervene, these symptoms of respiratory ob- uction increase to a marked degree. Extreme rapidity of breathing, h alterations in its character and rhythm, are also met with, how- r, in cases where the pulmonary obstruction seems moderate, but ere the nervous system is profoundly disturbed.

The *pulse* is accelerated from the very first, and during the height of disease, rises to 120, 140, or even 180, according to the age of the ld. In grave cases it may become extremely small, feeble, and com- ssible, but scarcely ever is intermitting or irregular.

The *eruption* of typhoid fever in children presents precisely the same pearances as in the adult; it usually appears first on the upper part the abdomen, and often presents several successive crops. It is, how- er, more frequently absent entirely, and presents even greater irreg- rities, as to the date of its appearance, in them than in adults. The undance of the eruption certainly bears no relation whatever to the verity of the attack; and in a varying proportion of cases (7 in 30, llier), the most careful daily examination fails to detect the charac- ristic spots at any period of the case. The eruption makes its ap- arance in a large majority of cases between the sixth and twelfth ys, but the first spot has been observed so late as the twenty-fifth y (Hillier), or the twenty-ninth (Rilliet).

Sudamina are frequently present in large numbers at any time after e ninth day.

Epistaxis is very rarely abundant, but is met with in a majority of es at some period after the third day.

Nervous Symptoms.—In none of the symptoms of this disease is such iety observed as in those furnished by the nervous system.

n mild cases, consciousness is retained throughout the attack; the ression of the face is stupid and heavy; the child is dull and dis- ed to doze during the day, but becomes feverish and restless to- rds night, and sleeps uneasily and wakes frequently.

n more severe cases, the nervous symptoms soon become prominent. e face assumes an almost characteristic expression: the eyes are

or muttering incoherently, and struggling violentl
The delirium is rarely continuous but is more marke
being replaced during the day by more or less profo
however, rarely amounts to actual coma.

Subsultus and carphologia, as well as muscular rig
tively rarely observed in children, and only in very
vulsions, even of a general and violent character, are
small proportion of cases; they may occur in the ea
which subsequently recover, or as one of the final
cases. They are, however, at whatever stage they
of very grave import. In a case mentioned by We
recurred on two successive days at the middle of the
fever, and were succeeded by hemiplegia, which
gradually diminishing, for four days. The child wa
before their occurrence, and continued so for severa
eventually recovered.

As a general rule, the course of typhoid fever is
attended by any *complication* in children than in adul
ever, some which occur with considerable frequency.

We have already stated that cough and signs of sl
frequent in the early stage. In a considerable nun
symptoms become aggravated as the case progress
be a development of general bronchitis or even pne
quently, however, the condition of the lungs is rathe
congestion than of true inflammation. These co
present in a marked degree, protract the case and
danger. Pleurisy is comparatively rare.

Perforation of the ileum, from ulceration of Peyer
rare in children than in adults; but when present giv
symptoms, and leads to an equally rapidly fatal resu

lts, as is also phlegmasia alba dolens, of which, however, there are
ances on record.

'here is very little tendency to the formation of bed-sores in chil-
n, and with care in the management of the patient, they will scarcely
r occur. In some epidemics, gangrene of other parts, as of the vulva
heek, have been observed in a few instances. Angina, and occasion-
pseudo-membranous laryngitis, have also been noticed.

Ve have seen that the urine is at times albuminous, and in these
es there is undoubtedly an intense congestion of the kidneys, which
ery rare instances eventuates in Bright's disease. Œdema is not
ally present, even when there is albuminuria, though Rilliet records
cases where anasarca, accompanied by albuminous urine, appeared
the fifth day, and lasted about a week. When œdema appears late
he course of the disease, it is probably to be rather attributed to a
tery state of the blood and the debility of the circulation.

Ve have already seen that the febrile movement in typhoid fever, in
ldren, presents such marked remissions, as to have led many obser-
s to apply the name infantile remittent fever to the disease. We
st bear in mind, however, that it is far from being rare for a true
larial element to be present, complicating the case, and constituting
typho-malarial fever.

)uring the height of the disease, it is rare for any of the other erup-
fevers to make their appearance; but during convalescence, variola,
eola, and scarlatina, have all been occasionally observed to appear,
run through their regular course.

'uberculosis is by some regarded as one of the most frequent of
sequelæ of typhoid fever in childhood; and in some cases, indeed,
appears as though the extreme debility of constitution induced
the disease favored the development of tubercle in children with
editary predisposition. It is probable, however, that in some cases
the early stage of acute tuberculosis has been mistaken for typhoid
er, with which, as will be more clearly pointed out, it possesses some
ng features of resemblance.

'ONVALESCENCE.—The convalescence is, as in adults, tedious and un-
tain. The child often remains for many weeks in a condition of great
ility, and with such extreme nervous exhaustion, that hydrencepha-
symptoms may even be present.

'he digestive system also manifests this debility in a most marked
ree, and it requires the greatest tact and care to encourage the child
at and, at the same time, to regulate the diet, since the slightest in-
retion will serve to excite serious symptoms. Not rarely death en-
s many weeks after the termination of the disease itself, in a state
ntense emaciation, the child being worn out by persistent diarrhœa,
ch resists all change of diet and treatment.

Ve have already alluded to the fact, that occasionally relapses have
n observed, either without cause or following some trifling indiscre-
, in which the symptoms of the fully developed disease have re-
eared and gone through their regular course.

decidedly less in children than in adults, partly owi
tive rarity of dangerous complications, and partly t
disease is usually of a less severe type. In mild ca
ever occurs; and even in the more severe forms, th
from 5 to 10 per cent., under favorable hygienic circ

DIAGNOSIS.—We have already stated that, partly o
fect recognition of typhoid fever, and partly to the va
were loosely applied to this disease as occurring in c
merly frequently confounded with other affections.

There are, however, several diseases from which it
even with our improved knowledge of its peculiar s
guish it.

Thus, in some cases of gastro-enteritis, such as a
children, and especially when the disease assumes a
resemblance to typhoid fever is so great as to have
thez to assert that it is impossible to make a differe

It should be borne in mind, however, that typho
be traced to epidemic or endemic influence, and occ
gion; that it is very rarely possible to assign any di
for the attack; and that it especially attacks child
of age, comparatively rarely those between two a
very rarely those under the former age. Its ons
gradual; the vomiting and diarrhœa are rarely so
is more intense, the loss of strength greater and mo
marked dulness alternating with delirium during th
rence of the characteristic eruption and of epistaxis,
duration, form a group of symptoms which should s
to clearly distinguish these two diseases.

In some cases, as already stated, the pulmonary c
in the form of diffuse bronchitis or of pneumonia, a

e, as well as to the existence or absence of the characteristic symp-
ns of typhoid fever, such as diarrhœa, tympany, epistaxis, rose-col-
d eruption, to avoid any error in diagnosis.

In some cases of acute, general tuberculosis, in which the deposit
ects the brain, lungs, and intestinal canal, the symptoms may closely
emble those of typhoid fever. This form of tubercular disease may
velop itself in the midst of seeming good health, the child losing
ength and spirits; fever of a remittent type soon appearing; with
miting, diarrhœa, tympanitic abdomen, and dry, furred tongue; and
lness of mind during the day, alternating with delirium at night. At
e same time there is cough and rapidity of respiration, though the
posit in the lungs may be too slight and uniformly diffused to reveal
elf by any positive physical signs.

In some such cases, indeed, it is only possible to form a probable
agnosis, based upon the age and previous history of the child; for
ute general tuberculosis appears even at the earliest ages, and especi-
ly in children who have an hereditary tendency to tubercular disease,
who are delicate and frail, or have lately passed through an attack
some one of the eruptive fevers, or of hooping-cough; and upon the
sence of eruption and the greater duration of the case.

Usually, however, there is a sufficient ground for diagnosis furnished
the special symptoms, even early in the course of the case. Thus,
typhoid fever the vomiting in the early stage is rarely frequent or
stinate, and only follows eating; and, though the bowels may be
nstipated for a day or two, diarrhœa soon makes its appearance, and
abdomen begins early to enlarge. In acute tuberculosis, on the
er hand, the vomiting in the early stage is usually both frequent
obstinate, and occurs entirely causelessly; whilst the bowels are in
st cases constipated, and the abdomen retracted until a much later
iod in the case, when the disease of the mucous membrane excites
rrhœa. The approach of fever in the tubercular disease is more
w, its course less regular, and its degree less intense, as a general
e, than in typhoid fever.

The nervous symptoms in the early stage of the two affections may
almost identical, but before long, in cases of tuberculosis, some of
unmistakable signs of tubercular meningitis, such as strabismus or
tial paralysis, usually appear. Epistaxis is rare in tuberculosis, and,
course, the characteristic eruption of typhoid fever is absent, though
must be borne in mind that this is not constant in the latter disease.
d, finally, though the pulmonary disease may in some cases be slight
not reveal itself by positive physical signs, most important aid is
en derived from a careful exploration of the chest.

TREATMENT.—Typhoid fever in childhood requires the same general
n of treatment as in adults. In mild cases little else is required
n strict attention to all hygienic precautions, and a supporting, but
d and digestible, diet. Whatever complications ensue, should of
rse be treated appropriately. There are, however, a few indications
regard to which it may be well to speak more in detail.

there be reason to think that the stomach contains
ting food, an emetic of ipecacuanha may be given.
constipated, very small doses of some mild laxative, a
rhei aromat. should be given during the first week;
neous diarrhœa is present, it should, unless it become
interfered with. When, however, the stools exceed t
chalk mixture, with some vegetable astringent an
doses of opium and acetate of lead, or of paregoric
ministered.

In ordinary cases, the nervous symptoms scarcely r
attention. When, however, they become marked, it
to apply wet cloths to the head and to administer w
baths to allay the agitation. In cases where delirium
with great nervous agitation, the above remedies sh
but, in addition, small doses of chloroform with camp
of opium, should be given, and will often produce t
Dr. West speaks highly in such cases of the combina
tartar emetic, recommended by Graves in the treat
symptoms of typhus fever. It will be found, also, tha
of five grains at three to five years, or of bromide of p
of seven to ten grains at the same age, repeated accord
of the symptoms and the effect produced, will often p
affording relief.

In regard to the occurrence of complications, we ha
to the remedies by which diarrhœa is to be checked
cessive. When the symptoms of pulmonary obstructio
frequent counter-irritation by mustard or turpentine
to the chest, and stimulating expectorants, as carbo
ammonia, administered internally.

Hemorrhage from the bowels and peritonitis from
be treated exactly as in the adult, the one by

at of the body. In some cases, also, where the remittent character the fever is marked, and where there is a suspicion that the case is mplicated with a malarial element, it should be administered in full tiperiodic doses in the earliest stages.

Opium is rarely necessary in the early part of the disease, unless it e required to check diarrhœa; but when, in the latter part of the cond or third week, the delirium becomes extreme, and the child eeps but little, the night being spent in violent restless agitation, with ud screaming, opium should be fearlessly given until quiet sleep is roduced.

The oil of turpentine is to be administered under the same conditions hich call for its use in adults.

Stimulants are by no means absolutely necessary in all cases of typhoid ver in children. Excepting in the very mildest, however, it is prudent administer them in small quantities after the middle of the second eek. When, however, the condition of the child calls for their more ee use, as shown by the frequent feeble pulse, rapid labored breathing, y, brownish tongue, dulness alternating with noisy delirium, and other arked nervous symptoms, they should be given to the extent of f℥iij f℥vj of sherry wine, or even of brandy, to children of six years old. will be found in these cases that even such large amounts of stimu- ts as the above are very well borne by children.

The food should be given in small quantities, and frequently repeated. should throughout the entire course of the disease be exclusively id, consisting of milk, chicken-water, or the various animal broths. is rarely difficult to regulate the diet of children suffering with this ease, since their entire loss of appetite renders them indifferent to food, and they will usually take whatever is offered to them.

During convalescence, the utmost care must be exercised, both in ard to food and exercise. Solid food should be permitted very dually, and with much caution; beginning with the lightest and st digestible forms, and watching the manner in which each article digested.

In those cases where the child remains a long time in a condition of treme debility, with impaired power of digestion, the bitter tonics d iron should be given, if the stomach will tolerate them. Sea, or d water bathing, change of residence, and the utmost attention to hygienic rules, are also to be recommended. When there is any ason to dread the development of tubercular disease, this treatment st be carried out with the greatest assiduity; and, if the child can gest it, cod-liver oil may be given with advantage.

ARTICLE I.

SCROFULA.

It does not seem appropriate, in a work whose chie
signed to be practical, to enter upon a full discussion
pathological questions connected with the subject of
larly in regard to its relations to simple chronic infl
one hand and to tuberculosis on the other. Indeed, i
these questions may be said to be still in such an uns
no definite position in regard to them can be assumed
We propose therefore to confine our remarks at pre
description of the most marked manifestations of scro
recognized, and to a discussion of the appropriate tre

Definition; Characters.—The term scrofula is of
ing. It appears to have been originally applied to a
state of the system in which there is a special tendenc
of the lymphatic glands. Subsequently it has been
many and such varied senses as to make it difficult
decide in which way it is meant to be understood. W
be understood to employ it much in the old sense, to in
constitutional condition in which there is a "*vulnerable*"
of the lymphatics, which renders them liable to becon
trifling causes, and at the same time indisposed to he
action; and which is also apt to manifest itself by
chronic inflammations of the skin, mucous or synovi
bones.

Scrofula is undoubtedly closely associated with tube
often happens that the children of tuberculous parent

er condition attended with the formation of cheesy deposits, which
y infect the system and give rise to acute miliary tuberculosis. On
e other hand, it is not common for tuberculous subjects to develop
y manifestations of scrofula; and, as West points out, we frequently
e whole families which display one or the other diathesis in its most
tense form, and yet perfectly uncomplicated. Scrofula, moreover, is,
r more markedly than tuberculosis, a disease of early life. The most
mmon and characteristic of its manifestations also are very different
m those of the latter disease; it affects the bones, the skin and ad-
cent mucous membranes, the glands, the synovial membranes in pref-
ence to the serous membranes, the lungs, the solid abdominal organs,
d the alimentary and respiratory mucous membranes. These differ-
ces in the leading pathological tendencies of these two great cachexiæ,
well as the many points of difference in the physical peculiarities of
ildren who are liable to tuberculosis or scrofula, are clearly and forci-
y pointed out by Jenner in a clinical lecture published in *The Med-
l Times and Gazette*, 1860, p. 259.

CAUSES.—Scrofula is, we think, in many cases undoubtedly due to
herited predisposition. As in the case of other cachexiæ, the actual
sease is not transmitted from parent to offspring, but merely so strong
tendency to its development that in some cases no care or favorable
gienic influences will overcome it. Not only do we meet with scrofula
the children of parents who themselves have been scrofulous, but
o in cases where a feeble and vitiated constitution has been inherited
m parents affected with tuberculosis or constitutional syphilis. In
er cases, it is undoubtedly acquired after birth, appearing in children
n to parents of sound constitution. The causes which tend to thus
velop it act by impairing the nutrition, and include such influences
insufficient, improper food, protracted exposure to damp, cold, and
ecially to vitiated atmospheres, attacks of certain diseases, which
e measles, typhoid fever, and chronic malaria, exercise a remarkably
urious action upon nutrition.

SYMPTOMS.—Although by no means all scrofulous children present
e same physical peculiarities, there are yet certain features so com-
nly met with in such subjects as to have led to their recognition as
ming together the symptoms of a *scrofulous diathesis*. Thus, as a rule,
h children are heavy and lethargic in mind, and of phlegmatic tem-
rament, with dull expression, and thick, opaque skin. The features
e apt to be coarse, especially the lips and nose; the lymphatic glands
e perceptible to the touch; the abdomen is apt to be full and large;
d the bones are large, with coarse, thick ends.

There is nothing peculiar or pathognomonic about the special mani-
tations of scrofula. Almost all of them may also appear as simple
opathic affections due to some definite exciting cause, in children of
tirely sound constitution. That which characterizes these same af-
tions when they occur in what we term the scrofulous form, are
e trivial causes which excite them, the inveterate obstinacy with
ich they persist, and their association with other analogous phe-

nomena in the same subject. There is also in some cases a certain order of succession of the manifestations of scrofula which has even led to the division of its course into three stages, corresponding somewhat to the classic phases of constitutional syphilis. Thus in the earliest stage, the lymphatic glands and skin are chiefly affected; subsequently affections of the mucous membranes and cellular tissue make their appearance; and in the final and most aggravated form the bones and viscera suffer. We cannot affirm, however, that this division and order of succession of the manifestations of scrofula is by any means constant or even marked in many cases.

Most of these manifestations appear as chronic inflammation of the part affected. At times such inflammation seems to arise spontaneously, while more frequently some more or less trivial exciting cause can be assigned. Thus the scrofulous enlargement of any group of glands is apt to be preceded by irritation of the area whose lymphatics pass to the affected glands, as, for instance, enlargement of the cervical lymphatics follows eruptions on the scalp or behind the ears, or attacks of sore throat.

Among the most frequent affections which are generally classed as scrofulous may be mentioned, without any reference to their frequency of occurrence, enlargement of the superficial lymphatic glands, cutaneous eruptions, especially of the vesicular and pustular varieties, small subcutaneous abscesses, chronic inflammation of the mucous membranes which are continuous with the external skin, as of the conjunctiva, the membrane of the external auditory meatus, that of the nose, and of the vulva and vagina, chronic effusions in the synovial membranes, chronic ostitis with caries.

The reader is referred for more detailed accounts of these numerous local scrofulous affections, to the special works which treat of the diseases of the skin or organs of special sense, or to general treatises upon surgery. Our own purpose is of necessity limited to a discussion of the general symptoms and treatment of the scrofulous cachexia, rather than of its numberless local manifestations. In the most advanced and severe forms of scrofula, lesions of various internal viscera may be developed. Among the most frequent and clearly marked in their nature, of these, are caseous bronchitis and pneumonia, and albuminoid degeneration of the abdominal viscera, the liver, spleen, and kidneys. Bronchitis and pneumonia at times appear in forms which entitle them to be regarded as scrofulous from the first. At other times, they apparently originate as acute inflammatory affections, but which, owing to the strong scrofulous diathesis of the patient, pass into a chronic form characterized by the low grade of the morbid products developed, by the obstinate and intractable course the affections run, and by the marked tendency to the occurrence of caseous degeneration and destructive changes in the diseased parts. In this condition, a sudden development of miliary tuberculosis not rarely occurs, either in the adjacent portions of the diseased organ, or throughout the other parts of the system. The exact nature of the primary changes in such cases s, at the present moment, one of the most unsettled and disputed points n pathology. The reader will find a tolerably full description of the esions and symptoms under the head of pulmonary phthisis. (See age 843.)

The exact relation of albuminoid degeneration of the viscera to crofula is also somewhat uncertain. Although one of the most fre-uent of the unfavorable sequelæ of scrofulous affections, it cannot itself e regarded as scrofulous in nature, since it makes its appearance in onnection with other cachectic states of the system. The attempt of Dickinson to associate it with the changes in the blood and tissues aused by prolonged suppuration (which so often occurs in scrofulous disease of the bones, joints, or glands), has not been altogether successful. Although it is undoubtedly true that in many cases where albuminoid degeneration has been developed there has been previous prolonged suppuration, there are many exceptions where the visceral lesions have apparently been induced directly in connection with the scrofulous or other cachexia. The occurrence of this sequel must always be antici-pated with anxiety in protracted and severe cases of scrofula. Although usually involving, simultaneously or in rapid succession, the various ab-dominal organs, the liver, spleen, kidneys, and gastro-intestinal canal, it may present a marked localization, for an indefinite time, in any of these parts.

When one of the above solid organs is affected with advanced albumi-noid degeneration, it is found enlarged, though still preserving its orig-nal shape; the peritoneal capsule is unchanged; and on section the issue presents a homogeneous, waxy, or lardaceous appearance, which s associated, when the section is examined by transmitted light, with bnormal translucence. The intimate nature of the change consists n an infiltration of the organ with a peculiar structureless albuminoid eoplasm or exudation. This first affects the walls of the arterioles, nd later the glandular cells of the organ.

When the kidneys are involved, there is usually œdema, which ap-ears early and increases rapidly; the urine is abundant, clear, with ut slight reduction in its specific gravity, contains a large amount of lbumen, and deposits numerous hyaline tube-casts. Albuminoid dis-ase of the liver and spleen usually coexist. The organs are markedly nlarged, as can readily be detected by palpation and percussion. here is usually abdominal dropsy, with distension of the subcutaneous eins of the abdominal walls; and frequently there is also albuminuria nd diarrhœa from coexisting disease of the kidneys and intestine. We ave much less frequently observed marked albuminoid disease of the astro-intestinal canal than of the solid abdominal organs, as above de-cribed. When it occurs, the walls of the stomach or intestine are hickened and present a peculiar homogeneous, glistening, and infiltra-ed appearance. The same microscopic changes are found as already escribed. The lesion of the mucous membrane is usually attended ith chronic diarrhœa, and, if the stomach is also seriously involved, equent and obstinate vomiting. Hemorrhages from the bowels have

finally their intractable resistance to the ordinary re
marked benefit which is often found to follow the us
scrofulous treatment.

Prognosis.—The prognosis in cases of scrofula must
upon the intensity of the diathesis, the gravity of the
tions, and the hygienic surroundings of the child. W
health is fair, and the only scrofulous affections presen
although the case is likely to prove obstinate and tedi
covery can often be insured. It must never be forgott
such children are liable to the recurrence of scrofulou
other form, and even to the development of the grave vi
have above alluded to. In the later and more advanc
cachexia, when serious disease of the osseous and glandu
the prognosis becomes in the highest degree unfavora

Treatment.—A great variety of local treatment—
and operative—is required for the various local scrof
We shall not, of course, attempt even to refer to these,
allude to the general principles that we think of pri
that, in the first place, all such affections should be cu
as possible, and also that, in their treatment, the e
proper hygiene and constitutional remedies should ne

The *preventive* treatment is of the greatest value; b
sists in the employment, with special and continued
of any child who probably possesses a scrofulous diath
precautions as to diet, dress, exercise, and residence,
giene would dictate. In children, born of scrofulous
parents, a wet-nurse should be secured even if the m
suckle them; and under no circumstances should the
to rear them on artificial food. Later, when the child
the diet should be of the most nutritious and digestibl

of doors as possible, when the weather is fine, dry, and sunny. If circumstances of the parents admit of it, the residence of the child uld be chosen in an elevated, dry, and comparatively open part of city, and for several months in each year it should be taken to the -shore, or to some elevated inland locality. While at the sea-shore, -bathing should be regularly followed, and throughout the rest of the r brine-baths, made with either bay-salt, or rock-salt, may be used ly. All forms of catarrhal inflammation, as angina, conjunctivitis, eritis, and the like, should receive prompt and careful attention and cured as soon as possible, since there is danger, if they are allowed continue, not only of their becoming chronic and extremely obstinate, t also of troublesome glandular enlargements being induced by the otracted irritation. After any of the local manifestations of scrofula ich we have above enumerated have made their appearance, the ove hygienic management must be sedulously persisted in. There e also various medical substances which exercise a beneficial effect by eir alterative and tonic action upon the general nutrition. Among ese the best are cod-liver oil, various preparations of iodine and of n. Cod-liver oil may be used alone, or combined with the compound rup of the phosphates of the alkalies and iron.

The preparations of iodine most frequently used, and which we have en led to prefer, are the compound tincture or solution of iodine, in e dose of from two to four drops three times a day, and the iodide of tassium, either alone, given in solution, as follows:

℞.—Potassii Iodidi,	gr. xxiv.
Decoct. Sarsaparillæ Comp.,	f℥iv.

Ft. sol. Dose, a dessertspoonful to a tablespoonful thrice daily, at three to five rs of age.

Or in combination with the iodide of iron, as follows:

℞.—Potassii Iodidi,	gr. xlviij.
Syr. Ferri Iodidi,	fʒij.
Syr. Zingiberis,	fʒx.
Aquæ,	f℥iss.

Ft. sol. Dose, teaspoonful thrice daily in water, at five years of age.

It is probable that the above is the best mode in which iron can be ministered, though it is often desirable to give it in association with inia or some other vegetable bitter, in order to stimulate the appetite d digestion.

Mercury, despite its powerful absorbent action, is not to be recom- ended for the treatment of scrofulous enlargement of the glands, in y form in which it is likely to produce its characteristic effect upon e blood. We are satisfied, however, that in some very obstinate cases ich resist all other modes of treatment, minute doses of the bi-chlo- le or bin-iodide may be employed without risk, and with much advan- ge.

ARTICLE II.

TUBERCULOSIS.

THIS subject has received from many authors upon
dren, far less attention than it merits, under the idea
a repetition, upon a small scale, of the same disease i
not possessed of any individual characteristics. In f
berculosis in childhood is an affection possessing cha
senting symptoms entirely special, and differing from
in adult life both in causes, locality, and clinical histor

CAUSES.—The causes which exert most manifest inf
duction are hereditary tendency, and all those debi
which act directly or indirectly upon nutrition. Of th
early weaning is the most prominent. Thus, we have
where a healthy woman, the mother of several vigoro
whom she had nursed, gave birth to one which she was
and this child, after pining for some months, died of an
cular meningitis. A bad quality of the nurse's milk, o
cial food after weaning, also exert a powerful influenc
tion of tuberculosis; and not unfrequently its develo
traced to repeated attacks of indigestion or diarrhœa.

It has also a tendency to develop itself after certain
especially in children predisposed by hereditary infl
diseases, rubeola, pertussis, typhoid fever, and, accordi
variola, are most frequently followed by tuberculosis.

There is still some difference of opinion in regard t

ANATOMICAL APPEARANCES.—The most frequent seats of tubercular eposit in the child are the brain, constituting tubercular meningitis, which has already been treated of at length; the bronchial glands, the ungs, and the mesenteric glands and peritoneum. It is, however, one f the distinguishing features of tuberculosis in the young subject, that t is apt to involve several viscera simultaneously, while not unfrequently the lungs remain free. Thus, in 312 children in whom Rilliet and Barthez found a deposit of tubercle in one or more of the viscera, the lungs were healthy in 47; while in 123 similar instances in the adult, Louis only found one such exception.

Locality.—In *bronchial phthisis*, which generally accompanies pulmonary phthisis, but also exists as a separate affection (though, according to Bouchut, this is a rare occurrence), the glands are much enlarged and inclose tubercular matter, frequently in large proportion. This is especially marked in those glands which lie along the trachea and around its bifurcation, and, when many of them are involved and adherent to each other, they form masses varying in size from a hen's egg to a large apple. The deposit, which in by far the majority of cases exists as infiltrated tubercle, does not usually soften, though cases are recorded where such softening has occurred, and the fluid has been discharged through an opening into a bronchus. Obsolescence and calcification, however, are quite common terminations of bronchial tubercles; and when the lungs do not become involved in the morbid process, a cure may be effected by these transformations. Calcified tubercle may be eliminated through a communication between the gland and one of the air-passages; and a few cases are also reported where the œsophagus, trachea, and even the pulmonary artery have been perforated in this manner. Most of these tuberculous glands are nclosed in a distinct and dense capsule, which may attain the thickness f one or two lines, and is usually quite vascular. This fibrous capsule s due to the hypertrophy of the originally delicate cellular investment f the gland.

Pulmonary Phthisis.—The anatomical characters of tuberculosis of the ungs in children, present several peculiarities, as distinguished from he same disease in adults. Thus gray granulations and crude miliary ubercles frequently exist in the lungs, independently of each other nd of any other form of tubercular deposit. In the adult, Louis disovered miliary tubercles unassociated with gray granulations only in out of 123 cases, or in 1.6 per cent.; and gray granulations alone in ut 5 more, or 4 per cent.; while in the child, Rilliet and Barthez found miliary tubercles without gray granulations in 107 out of 265 cases, or n 40.4 per cent.; and gray granulations alone in 36 instances, or in 3 per cent.; and the observations of West, "which are based on 102 ases, yield 20 instances of the presence of miliary tubercles alone, and 7 of the presence of gray granulations alone in the tissue of the lungs."

The great frequency with which the so-called yellow infiltrated tuber-le is observed in early life constitutes another anatomical peculiarity, illiet and Barthez, and West, having found it in from 23 to 33 per

per cent. of West's cases, and Bouchut found them ir
cases.

Occasionally the cavities resemble the vomicæ foun
adults, and this occurs with more frequency as we ad
age of six years. In other cases, the excavation is pro
ening of very small tuberculous deposits, distinct, thou
imity, which forms small vacuoles, communicating wi
with the neighboring bronchial tubes. All three of M
appear to have been of this form.

In addition to these two varieties of tuberculous
still a third, produced by the simultaneous softenin
portions of a lung affected with yellow infiltration. T
is most commonly met with in very early life, and in
gress with great rapidity, pervades the whole of th
instead of producing a central cavity. Cavities of thi
form very quickly, and involve large portions of lung,
lobe even being converted into a mere sac, with thin

There is another form of excavation occasionally
not a true pulmonary vomica, but the result of the sof
ation of a tuberculous pulmonary gland. The diagno
be rendered easy by reflecting that a pulmonary cav
dimensions is hardly ever solitary, unless it proceeds f
of tubercular infiltration, whilst the deposit of tube
place in the neighborhood of a diseased pulmonary g
the form of distinct deposits, not of tubercular infiltr

The last anatomical peculiarity, already alluded
phthisis in children, is its frequent complication with t
in the bronchial glands.

as as follows: intra-peritoneal in 40; extra-peritoneal in 22; both tra- and extra-peritoneal in 14; in the other 10 cases the exact seat as doubtful.

When the deposit involves the entire extent of the serous membrane, e find the anterior parietes of the abdomen adherent to the subjacent tructures, and the viscera so matted together and adherent, as to form n almost inseparable mass. More frequently, however, the tuberculiation is partial, and even limited to the vicinity of a single organ. he peritoneum investing the diaphragm, especially that portion which s in contact with the liver or spleen, or the adjacent parietal peritoeum, is very often affected; and as tubercles rarely fail to be deposited n the peritoneum covering these viscera, we find them firmly adhering o the diaphragm or abdominal wall.

In some cases the omentum is the chief seat of the disease, and may ither present numerous gray granulations scattered through its folds, r may be thickened or matted together from a kind of grayish tuberular infiltration, due to the coalescence of innumerable minute gray granulations. It is more rare to find the tuberculization limited to the intestines, merely causing adhesion of the adjoining coils.

In examining the adhesions which are almost universally found to exist between the various organs and portions of peritoneum affected, we find them to present two elements. In the first place, the tubercular deposits on the adjoining surfaces gradually coalesce as they increase in size, and finally unite the surfaces by more or less extensive patches of tubercular matter. And again, at the same time, the subacute inflammation caused by their presence leads to the formation of cellular nd fibrous adhesions as in cases of simple peritonitis. This is well een in cases where some coils of the intestine present tubercular adesions to each other, forming masses which can only be separated by upturing the walls of the bowel, while between other coils the adheions merely consist of delicate and easily lacerated cellular bands.

It is a well-established fact that the tubercular granulations on the urface of the peritoneum have no tendency to perforate this memrane; but that the perforations which are occasionally found, especilly in the walls of the intestines, are due to the development and softning of the subperitoneal tubercles, which always tend to penetrate to its cavity. This same law holds elsewhere, and it is on this account hat the adhesions which so constantly form between tuberculous memranes are of such great value in preventing the escape of foreign atters into the serous cavities. In the intestines this action can be raced even further, and when tubercles exist under both layers of the eritoneum at a point of adhesion between two folds of intestine, as oftening advances, the layers of peritoneum are destroyed, and the ttle collection of tuberculous pus remains confined only by the inner oats of the two layers of bowel. Sooner or later these also break own, the softened tubercle is discharged into the bowel, and a direct ommunication established between distant parts of the intestinal anal, as between a fold of the ileum and the ascending or descending

these glands in one-half of all tuberculous subjects, it
erable quantity only in one out of every sixteen of th
The deposit generally appears as infiltrated tubercle, t
quently miliary tubercles are present. The glands at
ing from that of an almond to a pigeon's egg, and o
the aggregation of several enlarged glands, a mass is f
size of the child's fist.

The capsule which surrounds them is usually more
vascular than the same structure in tuberculous bronc
tubercular deposit here, as elsewhere, is liable to und
or softening, the latter process being more frequently

Owing both to the yielding nature of the abdomina
not resist the forward growth of the mesenteric gland
bility of the adjacent viscera, we never see the sam
pression exerted on surrounding structures, as is noti
zation of the bronchial glands.

Occasionally, however, adhesions may form betwe
mesenteric gland and a fold of the intestine, and ulti
perforation of the bowel.

In thus describing these various lesions as being a
their essential nature, we have purposely employed t
somewhat inaccurate and vague sense which was ass
within the past few years.

Recognizing, as we distinctly do, but one elementa
culous deposit, the gray granulation or miliary tuberc
is true, undergo cheesy degeneration, it is evident t
cases in which extensive and uniform cheesy deposits
depend upon scrofulous inflammation of the part than

to be explained in which such deposits soften and are evacuated, or lergo partial absorption and calcification, and where ultimately the ld's health is restored. We have preferred, however, in the present tion, for practical purposes, to group the descriptions of these various ditions under one common head, being unwilling to separate them il more extended study shall have more clearly demonstrated the gree of resemblance which exists between true tuberculous matter d such caco-plastic inflammatory formations.

SYMPTOMS.—The symptoms of tuberculosis in children may be studied der the forms of bronchial phthisis; acute and chronic pulmonary thisis; and tuberculization of the peritoneum and mesenteric glands.

Bronchial Phthisis.—In addition to the general symptoms of tubercu- is, which will be fully given under the head of pulmonary phthisis, e most marked symptoms of bronchial phthisis are those due to the chanical effect of the enlarged and hardened glands upon the sur- unding tissues. Our knowledge of the functions of the lymphatic ands is as yet so inaccurate that we are entirely unable to appreciate e symptoms of disordered action which are probably present in cases extensive disease of these organs.

Bronchial phthisis occurs in its best marked form between the ages two and six years; and in many cases appears to be developed after ne severe attack of bronchitis, either accompanying measles or aris- without apparent cause.

The cough which, in the early stage, is hacking and not very trouble- ne, soon acquires severity and becomes intermittent, recurring in roxysms like those of pertussis.

The respiration becomes habitually labored and oppressed, with a longed wheezing sound, as in asthmatic cases.

The veins of the neck are often greatly distended, the distension be- ning extreme during the violent paroxysms of coughing; the face omes puffy and œdematous, a condition occasionally extending to upper extremities; and, as West points out, the superficial vessels the thorax become enlarged, just as those of the abdomen do in cases cirrhosis of the liver. The obstruction to the return of blood from superior vena cava is further shown by the occurrence of epistaxis, even of hemorrhage into the arachnoid; and the compression of the lmonary tissue occasionally produces hæmoptysis and œdema of the gs. Dr. Jenner has seen hydrothorax produced from compression the vena azygos.

The œsophagus does not always escape the encroachment of the ands, but may be so compressed as to produce dysphagia.

It is hardly necessary to say that so long as the tubercular deposit mains small, it may exist without causing any symptoms, and it is ly when several glands become infiltrated with tubercle, enlarged and m, that they give rise either to the symptoms already enumerated, to the physical signs below alluded to.

Physical Signs.—In estimating the value of these, it is necessary to nstantly bear in mind the fact that the enlarged and tuberculous bron-

ıh and strength to the little patient, all tend to awaken delusive
. In the great majority of cases, this respite is but brief, and the
e again resumes its onward course; but there are well-authenti-
cases on record in which the gravest symptoms have gradually
peared, and the child has ultimately regained fair health. In
cases, the tuberculous deposit may either have undergone creta-
degeneration, or, having softened and formed an opening into a
hus, have been expectorated.

characteristics of bronchial phthisis, which we have been con-
ng, are thus summed up by West:

The frequent development of its symptoms out of one or more
ks of bronchitis.

The peculiar paroxysmal cough which attends it, resembling that
ipient pertussis.

The great and frequent fluctuations in the patient's condition,
he occasional and apparently causeless aggravation both of the
and dyspnœa."

nptoms of Pulmonary Phthisis.—Valuable as are the general symp-
of tuberculosis in the adult, it is in the young child peculiarly that
reach their highest importance, owing either to the absence or
ifficulty of appreciation of many symptoms which aid greatly in
iagnosis of phthisis in adult life.

is necessary, therefore, to examine with the greatest care the
s hereditary tendencies, its past history, and its appearance and
cal development. Thus it is in cases of inherited tuberculosis
ve see its characteristic features most strongly marked, in the tall,
frame; the firm bones, with small and yielding cartilages; the
te diaphanous complexion; the fine, silky hair; the active, often
cious intelligence; the ease with which the general health is
ed by slight causes, and the peculiar proneness to catch cold on
ast exposure. By careful attention to these and other similar
s, as much, or often more valuable information can be obtained in
ıthisis of children, than from the most careful investigation of the
cal signs.

enumerating the symptoms, it is unnecessary to detail those which
in common with pulmonary phthisis in the adult, save to point
ny particular in which they may differ as seen in the young sub-

e *cough* varies much, in accordance with the varying amount of
hial irritation, being at one time scarcely troublesome, or so ag-
ted and accompanied with such violent dyspnœa, from some in-
rrent attack of bronchitis, as to threaten immediate death.

not unfrequently has a somewhat paroxysmal character, from the
mpanying tuberculization of the bronchial glands. One of the
marked peculiarities of the cough in the phthisis of children is
ntire absence of expectoration, since the secretions are either re-
d in the bronchial tubes, or, if raised into the pharynx, are swal-
l without any effort at expulsion.

so exhausting to adults.

The *pulse* is always accelerated, and becomes ver
temperature rises.

The *appetite* is capricious, the tongue furred, and
perfect; the bowels alternate from a state of constip
and the stools are unhealthy in appearance, being ge
or clay-colored. Naturally, with this disturbed state
nutrition is seriously impaired, and the child steadi
strength. Indeed, in very many cases, the little
merely the symptoms of impaired nutrition, beco
drooping, and loses appetite, strength, and flesh, for
fore the development of cough reveals the lungs a
disease.

Physical Signs.—We have already remarked the fa
vestigation of phthisis, the physical signs are of much
case of children than in adults. This arises not only
of the physical and moral organization in childhood,
mode in which the tuberculous deposit takes place.
the deposit of tubercle in the lungs of children is m
fused and uniform; so that we lose to a great degre
derived in adults from a comparison of the results of
percussion in one part, with those obtained in anothe
reason, we are also deprived of those signs which,
developed in a single point: as, for instance, the *coar*
is of so much diagnostic importance as one of the ea
deposit of tubercle at the apex of the lungs.

Another source of difficulty and error lies in the fa
to, that the bronchial glands, when enlarged by the d

ted from a compressed bronchial tube containing mucus, for a bercular vomica. The only way in which this mistake, and equent too unfavorable prognosis, can be avoided, is by com- laily the results of auscultation and percussion, and noticing they remain exactly the same, or whether, while the dulness ssion over the enlarged glands persists, the results of ausculta- y from day to day with the varying amount of compression of chus and the nature of its contents.

further source of difficulty results from the loss of all the in- n which is derived, in older persons, from the vocal resonance alterations. And again, owing to the excitability of children, nd prolonged observation is required, both as to the situation, xtent, and duration of any inequality of breathing, before any n can be drawn from it.

y, the extreme resonance of the thorax in early life tends to he results of percussion by preventing the recognition of fine s of sonority, such as are readily detected in more advanced

lition, moreover, to these numerous sources of difficulty in the on of auscultation and percussion, we are compelled to add the t there is not a single physical sign peculiar to pulmonary in children; the dulness in the interscapular space in bronchial being indeed the only characteristic sign developed in either d even this does not appear until the glands have attained a ge size.

ave thus far been considering the symptoms of pulmonary in its usual moderately acute form, but it is necessary to be at in some cases it deviates from this course, being at one time ly rapid, and at another very chronic in its progress.

acute cases, we often find that there has been a previous de- tubercle or of caseous inflammatory exudation in different parts conomy, though to so small an extent as scarcely to have in- with nutrition or the performance of the functions, or to have d the least attention.

h a state of system, death may be produced in a few days or y an acute development of tubercle. When this occurs in the is not unfrequently attended by inflammation of the pulmonary yma, constituting tuberculous pneumonia; and, whatever may iew entertained as to the relation between the inflammation tubercular deposit, the recognition of this latter element is of test importance, from its bearing on the treatment to be

erculous pneumonia, in addition to the hereditary tendency and tory of the child, we rarely find the same heat of skin or vascu- ement as in pure pneumonia. The degree of oppression of the also, from the beginning, out of proportion to the catarrhal or l symptoms with which the case sets in. And auscultation both that the amount of inflamed lung-tissue is not sufficient to s being present, but is beyond doubt rightly explained by Rilliet Barthez, as due to the transmission of the impulse of the hand by agglutinated intestinal mass.

is only in very exceptional cases that even the most careful persion or palpation will detect any inequalities in the abdominal walls, to the presence of large tuberculous patches. In every case in ch the last-named observers detected any abdominal tumor, the ntum was found to be the chief seat of the tuberculous deposit.

fter this condition of the abdomen has persisted some time, the disled skin desquamates, and assumes a rough and dirty appearance. about the same period, usually, the cutaneous veins of the abdomen ome prominent and dilated, owing to the obstruction to the abdomcirculation.

s the case progresses, and the general symptoms assume more vity, these local symptoms become more pronounced. Like all ns of tuberculosis in children, however, the advance of this disease rely uniform, and intermissions and fluctuations in the symptoms often noticed. Toward the close of life, all the symptoms usually ergo aggravation, and the remissions become more and more rare brief.

eath is either produced by the advance of tuberculous disease in the gs, or by tubercular meningitis; or the little patient sinks from er exhaustion under the persistent diarrhœa and the repeated access of peritoneal disease.

ymptoms of Tuberculosis of the Mesenteric Glands.—The symptoms of condition are even less positive and diagnostic than those of tuculous peritonitis. So long as the glands remain only moderately rged, buried as they are beneath the small intestine, it is impossible letect their presence, especially as the absorption of chyle is not erially interfered with.

e have already mentioned, moreover, the comparative rarity of ptoms due to the pressure of the enlarged glands upon neighborstructures, such as perforation or compression of the intestines, and tation of the cutaneous veins, or œdema.

he modifications of the size and shape of the abdomen occasionally nish useful information. It is rarely so large and tense as in tuberous peritonitis, and its shape is rather globular than oval.

here is scarcely any tenderness on pressure over the abdomen, ess there is some accompanying peritonitis.

he only really pathognomonic symptom, indeed, is the detection of enlarged glands by palpation. This, however, is far from being sible in all cases, even when the bulk of the glands is very considble, as they are frequently covered and concealed by the intestines. t is, in fact, only in those cases where the abdomen is supple and xed, that we can establish the presence of the tumor, which is usulobulated, varying in size from a hen's egg to a large orange, and ed in the neighborhood of the umbilicus.

he digestive system here also presents more or less marked disturb-

not the advantage of the best hygienic influences, the
terminate in from 3 to 7 months, though occasionally
wards of 2 years. In private practice, on the other h
of chronic phthisis are met with, in which the disease
4, or even 5 years before producing death. It is extr
assign any probable duration for either tuberculous pe
mesenterica, as they can rarely be diagnosed during
of their development.

DIAGNOSIS.—The danger in regard to the diagnosi
children is not so much of entirely overlooking the n
ease, as of overestimating its amount. We have al
reasons why the physical signs of pulmonary and br
losis in children are less reliable and more difficult to
in adults. A proper attention to the hereditary tend
vidual history of the child; a close scrutiny of its physi
and development, with an intelligent interpretation
signs, will, however, generally suffice to prevent any s

In the earlier stages of the more acute forms of pht
with which it is most apt to be confounded is remitt
which it may be distinguished by the history of mala
the definite commencement of the case, and by the very
bations which occur towards night, attended with h
heat of skin, and considerable delirium. In its more
the diagnosis of pulmonary phthisis from chronic bron
tended with the greatest difficulty. In fact, the phys
two conditions are frequently so entirely analogous, t
the general symptoms of tuberculosis, the greater a
irritation, the more rapid emaciation, and the freque

nerally in infancy, whilst tuberculous peritonitis is most frequent ter the age of 3 years; and to the effects of simple remedies, will sually remove any doubt.

The cases which are most apt to be confounded with tabes mesenerica are those in which abdominal tumors, due to some other cause, re present. Thus, in extensive tubercular deposit in the omentum, ve may have, in addition to the general symptoms of tuberculosis, a vell-defined tumor about the middle of the abdomen. The greater legree of tenderness of the abdomen, and the mobility in this case, may, however, serve to distinguish it. Again, it is not rare to find in cases of digestive derangement, where irregular action of the bowels with more or less pain may have been present, a distinct and only slightly movable tumor in the abdomen, due to the impaction of the intestine with hardened fæces. A careful consideration, however, of the position of these masses, which is generally in one or the other iliac fossa; their entire painlessness and doughy character upon palpation, and their complete disappearance after the administration of laxatives nd enemata, will reveal their true nature.

Prognosis.—The very name of tuberculosis has grown, with only too nuch reason, to be almost synonymous with impending, unavoidable leath. And yet, while pulmonary phthisis shows the same fatal tendncy in childhood as in adult life, the prognosis is somewhat less loomy. For not only does well-directed treatment occasionally render deposit of tubercle in the lungs, whose existence has been proved by he symptoms of the incipient stage, inert and obsolescent; but in rare ases, where the deposit has advanced to softening and destruction of ng-tissue, a cure has been slowly effected by the evacuation of the oftened tubercle and the gradual cicatrization of the cavity.

In tuberculization of the bronchial and mesenteric glands, moreover, umerous cases have been noticed where the glands have undergone omplete calcification, and the progress of the disease has been arrested.

While, therefore, the prognosis must ever be grave and unfavorable, ve must bear in mind the possibility of recovery when the hereditary endency of the child is not too strongly pronounced, and the actual uberculous deposit not extensive or rapidly progressing.

Modes of Death.—Having thus spoken briefly of the prognosis, a ew words will suffice to call attention to the various modes in which hthisis brings about a fatal issue in children.

In the majority of cases, death occurs from sheer exhaustion of the owers of life, from impaired nutrition and perverted functions. In a ew instances of bronchial phthisis, death is suddenly caused by copious emorrhage, owing to the perforation of one of the pulmonary bloodessels.

The immediate cause of death is frequently found in an intercurrent ttack of bronchitis, pneumonia, or peritonitis; while, in other cases, e cerebral symptoms which precede the fatal event, show that the embranes of the brain have become the seat of tuberculous deposit.

It is not unusual, moreover, whether the original seat of the tuberculous deposit have been in the abdomen or thorax, for marked abd nal symptoms to be developed towards the close of the case; the tu culous ulceration of the intestines serving to maintain an uncontroll and exhausting diarrhœa.

TREATMENT.—*Prophylactic.*—In children whose parents are tuber lous, and who in early life give evidence of delicate health, the prop laxis becomes most important. The infant should be kept at mother's breast up to the age of fifteen or eighteen months; but case the mother be herself tuberculous, on no account should she allowed to nurse the child, for whom a healthy wet-nurse should be mediately procured. By attention to this precaution, we have s ceeded in raising children of tuberculous mothers, who had suckl their previous children and had lost them all in early life from tuberc lous disease.

As the child advances in age, every caution should be paid to its fo and clothing, to securing sufficient exercise in the open air, and fr ventilation in its sleeping apartment. When the circumstances of t parents permit it, it is of the greatest consequence that the child shou enjoy the benefits of a country life, in some healthy, invigorating mosphere, for four or six months out of every year.

The child should further be guarded sedulously from the ailments i cident to early life, and especially from hooping-cough and measle and the slightest disturbance of either the respiratory or digesti functions should receive prompt and careful treatment; nor should be tempted to discontinue these efforts, even if positive signs of tub culous deposit appear; for the possibility of these deposits in childho becoming latent or being evacuated, and the general health re-esta lished, should never be lost sight of.

Curative.—Little need be said of the treatment of fully developed t berculosis in children, since the same indications present themselves in adults, and call for the same remedies. The most essential points i the treatment are attention to all hygienic conditions, careful regul tion of the diet, and the administration of remedies calculated to im prove nutrition and primary assimilation.

It is indeed impossible to overestimate the importance of maintai ing the appetite and powers of digestion; and if these show any sig of failing, we should resort to some of the bitter vegetable tonics, which, perhaps, the combination of tincture of nux vomica, gtt. ij to with the compound tincture of gentian, ♏ xv to xxx, according to th age of the child, is most desirable. On the other hand, if we find reas to believe that any remedy we are administering disturbs the nutritio of the child, disgusts it, lessens its appetite, or rouses violent oppositio at every dose, it should be instantly abandoned as producing the ver effect we most desire to avoid.

The child should be strongly encouraged to take nourishing food regular intervals, and so soon as any of the articles of its diet becom unattractive, other preparations of similar nature should be substituted Milk should enter largely into the diet, and ought to be taken at leas 'ery morning and evening. Tender, finely divided meat should be ten at the midday meal, in such quantities as the digestion will easily ear. If marked signs of debility present themselves, a few drachms f good brandy may be taken at intervals through the day, with advan-ge.

When the stomach does not reject it, there are few remedies whose ction is more beneficial than cod-liver oil, given in the dose of a tea-poonful or even less, three times a day. In many instances, children oon become accustomed to the taste of this substance and even grow o relish it almost as a luxury, and to take it eagerly; in some cases, owever, the taste is so unpleasant that the children refuse to take it, nd it is, therefore, advisable in such instances to prescribe it in the combination recommended at page 366, at least during the first few weeks of its administration.

In those cases where it is impossible to administer cod-liver oil internally, very good results may often be obtained here, as well as under similar circumstances in other wasting diseases of children, by the use of the oil by inunction.

Iron and its various preparations are strongly indicated, and we can generally find some of the milder forms which will be readily tolerated. In those cases where there is considerable implication of the lymphatic glands, the syrup of the iodide of iron appears especially useful, and this may be well given alternately or in conjunction with iodide of po-assium.

Sea-bathing is strongly recommended, especially in the tuberculiza-ion of the glandular system; or, when this is not attainable, baths in hich some tonic drug has been mixed may be used.

In tuberculous deposit in the peritoneum or mesenteric glands, the iet must be regulated with peculiar care; the most bland, unirritating, nd digestible food being selected. If, however, despite our precautions, iarrhœa should make its appearance, the various astringents in combi-ation with opium should be given freely. The pain in the abdomen, hich is frequently so severe in these forms of tuberculosis, may be re-eved by the application of sinapisms, or of warm anodyne poultices, by gentle friction with a sedative liniment.

When the symptoms of any intercurrent inflammation in the diseased gan present themselves, we must limit our treatment to the applica-on of a few cups or leeches over the part, and the administration of less stimulating diet, with some mild febrifuge. When the perito-eum is involved in the tubercular deposit, and we have reason to fear accession of inflammation of that membrane, there is urgent neces-ty for the use of topical depletion in moderation; but we must, at e same time, bear in mind the cachectic nature of the disease, and frain from the adoption of any depressing plan of treatment.

different languages;¹ almost the only terms by wh
by English or American authors, however, are rick

An idea of the vast importance and frequency of
gained from the statements of some of the recent
subject. Thus Sir W. Jenner, whose lectures upon t
present a most original, philosophical, and lifelike
disease, speaks of it as "without question the most
important, and in its effects the most fatal of the di
sively affect children." Hillier, at the close of an
upon rickets (*loc. cit.*), presents a table showing the
the number of cases of this disease to the total num
treated at the Hospital for Sick Children, London,
culate that of 128,656 children treated during thirte
not less than 8419, or 6.5 per cent., were rachitic;
the proportion of such patients rose as high as 9 pe

The statistics furnished by other English writer
Merei, and Ritchie, support the view that in all cla
ciety a notable proportion of the children are rach
way, the highest German authorities, as Ritter v
Henoch, state that the proportion of the childre
institutions in that country, who are found to be
than 30 per cent.

Of late years, the attention of observers in this
more forcibly attracted to this subject, and, as a conse
of cases in which the early and less prominent symp
now recognized is rapidly increasing. In a paper
Parry,² which we regard as the most valuable cont
erature of rachitis which has been made on this si
the writer states that he has been "irresistibly for

city contain but two deaths reported as from rickets, is of little ortance, since so rarely is it assigned as a cause of death even in at Britain, that the Registrar-General has not found it necessary to ote a column of his tables of mortality to the disease. "The secary diseases," as Hillier says, "are recognized, such as bronchitis, apse of the lungs, atrophy, measles, hooping-cough, or convulsions, the primary disease, which renders these secondary diseases fatal, nored."

e shall limit ourselves to an account of the causes, general symps, and treatment of the disease, with a brief description of the anaical changes in the bones, and the deformities which result, refer- the reader who desires more minute knowledge on these latter nts, to any of the elaborate memoirs published on this disease.[1]

AUSES.—*Age.*—Rickets is essentially a disease of childhood, and in- may make its appearance during early infancy. There are also a cases on record which show that it may, although rarely, occur in fœtus before birth. It frequently may be detected during the first months of extra-uterine life. Gee has noticed positive beading of ribs at the third and fourth weeks, and Parry at the sixth week r birth. The age at which it ceases to be frequent for rachitis to in is variously estimated. We have observed a number of cases ere the earliest symptoms were detected during the second year; we should be inclined to assign as the limits of its most frequent urrence the second or third month to the close of the second year. rows rarer after this latter date, and many high authorities unite in ing that it never comes on after the completion of the first denti-

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The head is frequently bathed in profuse perspiration, which occurs especially during sleep, but also after any exertion, or even while the child is lying quiet. The skin of the trunk and extremities is hot and dry, and even the lightest covering seems oppressive to the little patient; so that there is a tendency to get rid of all the bed-clothing at night.

Another symptom which makes its appearance in a certain proportion of cases, but not so constantly as the digestive disturbances, local sweatings, and restlessness at night, is general soreness and tenderness of the body, with pain on movement: when this is marked, the child dreads to be moved or even touched, cries if its limbs be pressed firmly, and will lie almost motionless for hours. According to Parry (*loc. cit.*), this symptom is associated with the commencing bone changes, so that it properly belongs to the early part of the second stage.

If the disease begins before the completion of primary dentition, the development of the teeth is always impeded, and they are not only cut late, but either decay or fall very early from their sockets. The urine does not present any constant alteration, but in a certain proportion of cases the amount is increased, and there is an excess of the phosphatic salts, while in other instances excess of some free acid, said to be usually lactic, has been detected. The mental condition in rickets has been variously described; some authors regarding the intelligence as precocious, owing probably to the isolation of the patient from other children, and his constant association with his elders; while others assert that there is an actual deficiency in intellectual capacity and power. At a somewhat later period of the disease, the child acquires a peculiar staid and sedate aspect, which, when associated with the unusual breadth and squareness of the face, imparts a strange expression of age.

According to Roger and Rilliet, a blowing murmur may frequently be heard over the anterior fontanelle in this disease, synchronous with the arterial pulse. As, however, this murmur is to be heard in other conditions, and is often absent in cases of rickets, it cannot be considered as a sign of any positive value. The causes which appear to intensify it, are the anæmic state of the blood and the patency of the anterior fontanelle; yet Hillier states that he has found it present in thirteen, and absent in twenty-nine rickety children whose fontanelles were open.

The phenomena above described, when present in the same case, may certainly be regarded as positively indicative of the existence of this initiatory stage of rickets, but they are by no means invariably all present, so that it is often impossible to determine the approach of the next stage in which the characteristic lesions and deformities of the bones make their appearance.

They are not, moreover, limited to the stage of invasion, but continue, with more or less severity, for a varying time after the bone-changes have begun. The length of this stage of invasion is exceedingly irregular, and the earliest physical signs of bone-change may occur after it has affection of the bones; the last two are due chiefly to disease of the cerebrum.

Besides this thickening of the edges of the cranial bones, there are spots, irregularly distributed, where the bones are so thinned and softened that they yield to the pressure of the fingers; and, indeed, in some cases the thinning is so extreme that the pericranium and dura mater come in contact. These "soft spots," which constitute the condition known as craniotabes, were first observed by Elsässer (*loc. cit.*).

The nature and mode of their production has been a matter of much discussion. By some authorities their rachitic nature has been denied, but there seems to us no valid reason for doubting their essential connection with the rachitic alterations of the bones. They are usually limited to the occipital region, but may rarely be present over the other cranial bones. They are never observable save in those parts of the bones which are developed from membrane. At first, the spots affected are the seat merely of softening, with perhaps some thickening; then thinning of the bone occurs, and subsequently the entire thickness of the occipital bone is often removed, causing perforations. These vary in number from one or two to as many as twenty-five or thirty. In order to detect them, the skull should be carefully examined by fixing the head between the hands, and then pressing carefully over the upper part of the occipital region and the posterior portions of the parietal bones. The diseased spots are felt to be soft and easily depressed, and "impart the sensation of an orifice in the bone, closed by parchment." It is necessary to use much caution and gentleness in making this examination, since any undue pressure may produce severe nervous symptoms, even convulsions, according to Niemeyer. It is difficult to account for the production of these spots, but the most probable explanation is that they are dependent upon the prolonged pressure upon the softened bone, caused by the head resting on the pillow on one side, and by the counter-pressure of the brain on the skull on the other.

The curvature of the spine varies according as the child is able or unable to walk. In the latter case, there is a posterior curvature of the spine, beginning at the first dorsal, and extending to the last lumbar vertebra; while if the child is able to walk, this posterior curvature is limited to the dorsal region, but is combined with an anterior curvature in the lumbar region. The cervical anterior curve is increased, and consequently the face is directed upwards, and the head falls backwards, and being unsupported, owing to the muscular debility, sways loosely from side to side. Jenner points out that these curvatures may readily be distinguished from angular curvature, by the fact that the weight of the legs will usually remove them if the child be held by the upper part of the trunk, especially if the physician at the same time raises the lower limbs with one hand, and places the óther on the curved spine.

The thorax is subject to deformities, which in a practical sense exceed all others in importance, owing to the serious interference which they occasion with the action of the heart and lungs.

the sternum.

The curvatures and deformities which have been
this are chiefly due to the action of muscles or the w
ent parts; but the production of the last-described de
thorax is attributed by Jenner chiefly to the atmos
which, during inspiration, causes recession of the mo
of the thoracic walls, *i. e.*, the softened ribs at the
with their cartilages. In consequence of the support
heart, and spleen furnish to the ribs corresponding t
the groove extends further down on the left than o
but is deeper over the fifth and sixth ribs on the right
side.

The pelvis is frequently affected in rickets, and the d
result, on account of the great interference they cause
the female, rank next in importance to those of the th
ety pelvis is characterized by a shortening of the ant
ameter, so that the upper strait assumes an oval form
heart-shaped. In extreme instances the sides also a
give to the pelvis a triangular shape. It is evident th
be influenced by a number of conditions; as the stag
and the direction in which the pelvis is compressed b
above, and the thigh-bones from below.

Partly in consequence of the diminished capacity of
pelvis, partly in consequence of the weakness of the
cles, the flatulent distension of the intestines, and the
the liver and spleen which are frequently present, the
usually prominent in rickety children.

During the development of the alterations in the bo

During this stage of early convalescence, when the children attempt leave the bed and walk about, holding on to the chairs, there is great nger of increased curvature and even of partial fractures of the bones the lower extremities.

When, on the other hand, death occurs during the course of rickets, is rarely from the intensity of the cachexia (which explains the ap- rent anomaly of so fatal a disease being scarcely represented in the rtality returns), but from the supervention of some secondary dis- se. Among these, the following are enumerated by Jenner as the st frequent causes of death :

1. Catarrh and bronchitis, which are rendered far more dangerous m the mechanical interference with respiration caused by the de- rmed thorax.
2. Albuminoid (?) infiltration of various organs, especially of the er, spleen, and lymphatic glands. As will be seen by the remarks in e section on morbid anatomy, recent researches make it probable at the enlargement of these organs in rickets differs from ordinary uminoid change. This peculiar form of degeneration is not unfre- ently developed during the course of rickets; it manifests itself by reased emaciation, extreme pallor, occasional œdema and albumi- ria, and enlargement of the affected organs.
3. Laryngismus stridulus, which, according to Jenner, is essentially nnected rather with the nervous irritability due to rickets, than with e tardy and difficult dentition which is itself but another expression the constitutional disease.
4. Chronic hydrocephalus.
5. Convulsions, depending like the laryngismus stridulus, upon the ightened irritability of the nervous system.
6. Persistent and severe diarrhœa, which is probably due in many ses to albuminoid degeneration of the intestinal mucous membrane.

DURATION; PROGNOSIS.—The duration of rickets varies so greatly, at the disease may be said to present an acute and chronic form.

When the diathesis is marked, the hygienic conditions of the child ry unfavorable, and the disease makes its appearance at an early age, course is often very rapid, and death usually follows. When, on e other hand, the disease does not begin till late in the second or third ar, and when the surroundings of the child are more favorable, re- very usually occurs, although the disease may last for several years.

An unfavorable prognosis may be made, then, when the disease be- ns in very early infancy; when it is attended with marked constitu- onal disturbances; when the deformities of the head and thorax are pidly and extremely developed; when any of the secondary morbid nditions above enumerated have supervened. When, on the other nd, the reverse of these conditions obtains, recovery may be ex- ected, though often only after prolonged illness.

DIAGNOSIS.—It is only during the initiatory stage of rickets, that the ue nature of the attack is likely to be mistaken. But during this riod the disease may be confounded either with chronic entero-colitis, s in advanced rickets yield neither chondrin nor gelatin on

hickening of the flat bones is caused by the formation of new
ayers from the thickened and vascular periosteum, which are
t or near the growing margins of the bones, thus accounting
hickened ridges near the sutures of the cranial bones.

egree of thickening of the bones of the skull may reach a very
ree; a thickness of $\frac{1}{2}''$ having been quite frequently observed.
re also frequently found on the skull evidences of craniotabes
rm of round or oval perforations of the bone, which have been
le during life as "soft spots." These perforations are most
and frequent in the occipital bone, and are also found in the
bones, or wherever the skull has been subjected to pressure.
e surrounded by thickened bone, and are produced by the re-
of the calcareous salts, under the influence of pressure, while
kened bone is still soft and imperfectly ossified. In number
y from one to twenty or thirty.

dition to these changes in the bones, which are the constant
ntial lesions in rickets, there are certain lesions of the viscera-
ly met with, which depend partly upon the deformities of the
and partly upon the general cachexia. Thus, in consequence
eculiar deformity of the thorax, the anterior borders of the
come highly emphysematous, while the band of lung-tissue
nding to the deep groove at the sternal end of the ribs is com-
and collapsed.

eculiar and constantly present strip of collapsed lung, is due
ecession of the corresponding part of the ribs during inspira-
t frequently there is also found extensive collapse of the postero-
parts of the lungs from the ordinary causes, bronchitis and
respiration. Jenner has also called attention to the frequent
in rickets of white spots upon the pericardium, near the apex
art. These spots thus correspond to the depressed part of the
rib, and are in all probability due to the friction of the heart
this hard knuckle of bone.

ve before alluded to the enlargement of the liver and spleen
ppears in some severe cases of rickets. This was formerly re-
as due to albuminoid degeneration, but recent study of such
as made it probable that the alteration is a peculiar and spe-

ifferences between this change, and albuminoid (amyloid, of Vir-
egeneration were first pointed out by Jenner,[1] who showed that
ckety enlargement, the organs present no reaction with iodine,
in the spleen there is an absence of the peculiar sago-like trans-
n of the Malpighian corpuscles. Dr. W. H. Dickinson has
ently examined this subject with care, and has confirmed the
t the change in rickets differs both from albuminoid degeneration

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[1] Medico-Chir. Trans., vol. lii, 1869, p. 359.

and from the peculiar enlargement of th
known as Hodgkin's disease. The *liver* i
of size evenly throughout its whole bul
little blood, and is less friable than in h
The acini are yellowish and are surrou
line, due to increase of the interlobula
not, however, any bacony translucency
The spleen is even more markedly enla
weight may increase from one ounce to
sents a resilient hardness which in ext
Bright to the consistence of a half-ripe
a deep-red or purple, besprinkled with s
enlarged Malpighian corpuscles. The t
and there may be also morbid hyperpla
the meshes, the corpuscles being much
change is described by Dickinson, as du
formation foreign to the structure of th
larity of growth which alters the natur
The epithelial and corpuscular element i
the liver the capsule of Glisson, and in th
is abnormally developed. There would
of earthy salts in these organs.

In cases where death is directly due
bronchitis, intestinal catarrh, or chronic
course be found, in addition, the lesions

PATHOLOGY.—The description which h
of rickets, clearly establishes the fact th
in the same sense that scrofula and tuber
quently to regard the lesions of the bon
tion of the general cachexia. We are
beyond this point, since we are ignor
nature of the vice of nutrition, but equal
the changes in the bones.

The result of chemical analysis has led
essentially consists in a deficiency of the
and the attempt has been made to explai
an excess of lactic acid in the primæ vi
calcareous salts in solution, and prevents
the bones. Apart from the purely hypot
tion, and its entire inadequacy to expla
symptoms of rickets, it is to be borne in
acid in the urine is far from being consta
bones are characterized not merely by
careous salts, but by their abnormal posi
of an active vital process.

Again, the marked vascularity of the b
proliferation of cells, and the pain and c
attend the disease, have induced others t

atory one. But this view is controverted as well by the etiology
inical history of the disease as by its constant anatomical results.

ATMENT.—In cases where there is reason to anticipate the devel-
it of rickets, as where the previous children of the mother have
e rickety, the utmost attention must be paid to the feeding and
ne of the young infant. If careful examination of the mother's
proves that it is unsuitable in quality, a wet-nurse should be im-
tely provided, or if that be unattainable, the child should be fed
carefully selected cow's milk, or upon one of the substitutes for
n milk described in the article on thrush.

too, after the disease has made its appearance, the most appro-
, nutritious, and digestible diet must be selected, care being taken
t shall contain a large proportion of animal food.

teeth of rickety children are so defective that, when they begin
e solid food, it is highly necessary to insure its complete mastica-
and in cases where the condition of the teeth renders this impos-
the meat should be chopped finely and bruised in a mortar.

child should be suitably and warmly dressed, and be taken freely
he sunlight and open air. The use of salt-water baths, followed
tive friction of the skin, is also to be recommended.

ring the early stage, when there is marked constitutional irrita-
nd pain, the remedies used to relieve these symptoms should be
ne mixtures, such as the effervescing draught or neutral mix-
or magnesia (Copland), conjoined with sedatives and tonics.
r no circumstances should any depressing plan of treatment be
ed.

he digestion be much impaired and diarrhœa is present, the use
getable tonics, or wine of iron, with mild astringents and antacids,
icated.

remedy, however, from which most benefit is usually derived is
ver oil, and it should consequently be given, in conjunction with
nd vegetable tonics and a small amount of some generous wine,
n as the nature of the attack is recognized and persevered with
onths, or until the disease is overcome.

e efficacy of cod-liver oil in the treatment of this disease is, indeed,
markable that all other remedies formerly used have been sup-
ed by it. Vogel asserts (*op. cit.*, p. 534) that "rachitis may be
by the use of cod-liver oil alone, even if the circumstances are in
respects unfavorable." Rickety children usually tolerate the oil
and even become so fond of it that they will willingly take large
. In some cases, however, it disagrees with the stomach and is
ately refused by the children; and when this happens, so im-
nt is the introduction of the oil into the system, that we should
mend its use by inunction. It very rarely happens, however,
he difficulty in its administration cannot be overcome by having
il prepared in the form of an emulsion, either according to the for-
recommended on page 366, or in combination with the lacto-phos-
of lime.

In order to guard against deformities, the littl
upon a firm, smooth mattress, and high pillows s
Niemeyer recommends that small children should
basket; while larger ones should be drawn about
vided with a mattress. Sitting up for any length c
at walking, should be prohibited until the bones h
inflexible.

It is not advisable, especially during the earlier s
to employ any mechanical contrivances to prevent
ties. During convalescence, however, attempts ma
the deformities by means of leather or pasteboard s

In the treatment of any intercurrent affections
bered that we have to do with a condition of mal
bled vitality, so that all remedies of a depressing
scrupulously avoided.

ARTICLE IV.

CONGENITAL SYPHILIS.

INFANTILE syphilis may be either inherited or ac
birth. As, however, the characters of the latter
materially from those of acquired syphilis in the a
our description to hereditary syphilis.

Careful clinical observation appears to have clear ably more severe than when the father alone is syphilitic, and thus such embryos usually perish, and are prematurely cast off by abortion, so that the great majority of children with congenital syphilis have inherited it from their father. While the last statement is almost universally admitted, there are some authors, as Hutchinson,[1] who do not admit the greater severity of the disease when the mother is the source of contagion. Finally, that a syphilitic father may infect the ovum without contaminating the mother's system, though the mother may subsequently herself be infected by the embryo.

In very many cases, though unfortunately not in all, the infected embryo perishes, and abortion follows. When, however, such infants are born living, they usually present no trace of syphilitic disease at birth, but may appear well nourished and healthy. Occasionally, however, children have been observed who presented, at the time of birth, copper-colored blotches upon the skin, condylomata, or mucous patches.

In the majority of cases the first symptoms of the disease appear between the fifteenth and thirtieth days after birth, though in many instances also during the second month. Thus of 158 cases collected from various sources by Diday,[2] the disease showed itself—

During 1st month in	86
" 2d "	45
" 3d "	15
At 4th month in	7
" 5th "	1
" 6th "	1
" 8th "	1
" 1 year, ...	1
" 2 years, ...	1

So that 131 children out of 158 presented evident symptoms of syphilis before the end of the second month.

Among the earliest evidences of the disease are the signs of failing nutrition. The infant, who has grown well, and has been plump and apparently vigorous for a few weeks, begins to emaciate, the features become pinched, the skin assumes a dry, sallow, shrivelled appearance, and presents patches of yellowish-brown discoloration, especially on the prominent parts of the face; the voice becomes feeble, whimpering, and plaintive, and the infant soon acquires a remarkable expression of premature old age.

The appearance of the skin has been most minutely described by Trousseau,[3] West,[4] Diday, and others, and is in a high degree characteristic of the disease.

In addition, however, to these general symptoms of malnutrition, there soon appear the signs of constitutional syphilis, familiarly met with in the adult, as well as some which are peculiar to the disease infancy.

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[1] Art. Constitutional Syphilis, in Reynolds's Syst. of Med , vol. i, pp. 297 and 315.

[2] Infantile Syphilis (Syd. Soc.), 1859.

[3] Clin. Méd , 2ème ed., 1865, t. iii, p. 291.

[4] Dis. of Children (4th Am. ed.), 1866, p. 577.

The symptoms now to be described belong partly to the seconda and partly to the tertiary stage, for it is a peculiarity of infantile syp lis that the evolution of the symptoms does not follow so orderly course as in syphilis of the adult. The symptoms most frequently m with are certain affections of the skin and mucous membranes. Amo the cutaneous eruptions, pemphigus is one of the most characterist It is also the first eruption to appear, not rarely being present at birt and never, according to Niemeyer,[1] commencing later than the end the first week of life.

It usually appears first on the palms of the hands and soles of t feet, and may afterwards spread to various parts of the surface. It b gins as small round spots, of reddish color, which become converted a day or two into bullæ, filled with turbid fluid. These burst, leavin irritable excoriations, and are succeeded by fresh crops of similar ves cles. The early appearance of pemphigus is of most fatal import though in some cases recovery gradually occurs in the course of a fe weeks. The other forms of eruption usually occur after the genera symptoms of malnutrition, above described, have appeared. At time the eruption consists of sharply defined patches of roseola or erythem of small size, of coppery or yellowish-red color, not disappearing upo pressure, and occurring usually upon the abdomen, the inner surface o the thighs, or the lower part of the thorax.

In other cases, the eruption assumes a papulated form, the papule being quite prominent, and usually presenting a superficial desquama tion. A form of acne, attended with the appearance of indurated pus tules which leave little depressed cicatrices, is not unfrequently me with; and so, also, vesicular and pustular eruptions occur in a good many cases. The most frequent of these eruptions is unquestionably the maculated form; while dry, scaly eruptions are in particular quite rare in infantile syphilis. In most cases the specific character of the eruption is manifested by the peculiar coppery color of the macula, or of the inflamed base of the papule, vesicle, or pustule. In other instances the specific character of the eruption must be inferred from the coexistence of other manifestations of constitutional syphilis.

The most frequent of these, next to the cutaneous eruptions, are the affections of the mucous membranes. Thus, coryza, of a serious and most obstinate form, is one of the most constant symptoms met with, and presents here all the characters fully described in our article upon that subject. The nasal mucous membrane is so much swollen that breathing and nursing are seriously interfered with. There is a profuse discharge from the nostrils, either of a thin, irritating fluid, which flows over the lip and excoriates it, or of a thicker pus, which tends to concrete and form thick, discolored crusts. The obstruction to resp-

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[1] Textbook of Pract. Med. (Am. trans.), 1869, vol. ii, p. 706.

tion, and the accumulation of secretion in the nasal cavities, gives
e to a peculiar snorting or snuffling quite characteristic of the disease.
There is apt to be, at the same time, a superficial diffuse inflamma-
n of the mucous membrane of the mouth and throat, which may ex-
nd into the larynx, causing, in conjunction with the coryza, great
teration in the cry or voice, which is hoarse, and has been under
ch conditions compared by West to the sound of a child's penny
umpet.

Despite the severity and obstinacy of the coryza, there very rarely
curs any ulceration of the mucous membrane, or necrosis of the nasal
ones, or of the hard palate. In a few cases, however, depression of
e bridge of the nose has been observed in consequence of the destruc-
on of the nasal bones, and West records a case in which there was
ecrosis of the hard palate in a young infant.

Another very frequent symptom is the formation of rhagades or fis-
res at the junction of the mucous membranes and skin, as on the lips,
d at the verge of the anus. These rhagades bleed upon any stretching
the parts, and by their laceration so much pain is caused that, when
e mouth is affected, the child dreads to smile, talk, or suckle; and
hen they are seated on the anus, defecation is attended with extreme
ffering. Occasionally rhagades form in the skin in the flexures of the
ints, and especially in those of the fingers and toes.

Condylomata are also frequently present, and, like the rhagades, are
ost frequent at the orifice of the anus and mouth, though they may
so form elsewhere upon the skin, as upon the vulva, between the scro-
m and thighs, in the axillæ, and behind the ears.

In consequence, probably, of the softening and ulceration of these
owths, large, sinuous, irregular ulcers may form in such positions,
tending for some distance into the surrounding skin.

In a few cases, iritis occurs; and so too the deeper seated tissues of
e globe, as the vitreous humor, retina, or choroid, may become in-
amed.

Death very frequently ensues before the end of the first year, either
consequence of the severity of the coryza and the inability to nour-
h the little patient, or in consequence of the profound cachexia and
æmia, or the development of some of the visceral lesions, to be here-
fter described. When, however, owing to judicious treatment, or the
omparatively slight development of the early symptoms, the child sur-
ives, the disease frequently subsides about the end of the first year;
ut often, after remaining latent for a variable time, reappears in the
rm of tertiary symptoms. According to Hutchinson, this tertiary
och may begin at any period after the fifth year, but is commonly
layed till at or near the period of puberty. In addition to the traces
hich may remain of the earlier symptoms, such as little pits and scars
on the skin, alterations in the form of the nose from long-standing
sal obstruction, or actual disease of the nasal bones, there are several
ry characteristic symptoms amongst the later manifestations.

Among these is a peculiar alteration of the permanent incisor teeth, organ with the peculiar albuminoid substance, called "amyloid," by Virchow. It is comparatively rare in children to find gummy tumors developed in the substance of the liver, with thickening and cicatricial puckering of the capsule, as are so often met with in visceral syphilis in adult life.

In the lungs, gummy tumors of various sizes form, and usually present cheesy degeneration of their central portion; and there is at times also a form of consolidation, called by Virchow "white hepatization," which depends upon chronic catarrhal pneumonia, with infarction of the air-vesicles with epithelial cells, in a state of partial cheesy degeneration.

More rarely, gummy tumors have been found in the substance of the brain. The thymus gland is occasionally the seat of suppurative inflammation, so that, on section, abscesses may be detected in the substance of the organ. Of course in cases where periostitis, with the formation of nodes, has been present, the ordinary appearances of such lesions will be observed.

Diagnosis.—During the presence of the early symptoms, the diagnosis is usually made with ease, by observing the presence of pemphigus soon after birth; of other eruptions, with copper-colored discoloration of the skin, appearing a few weeks later; of condylomata and rhagades; and of coryza, stomatitis, and laryngitis. The general symptoms are also peculiar, especially the physiognomy and the discoloration of the skin. And we should, in addition, endeavor to confirm our suspicion by obtaining a clear history of the parents' condition at the time of conception.

During the later periods of the disease, at or after the period of puberty, the diagnosis is no less important, and far more obscure. We must now rely upon the history of the case, upon the condition of other children of the same family, upon the detection of traces of the earlier symptoms, upon the presence of the peculiar alteration of teeth described by Hutchinson, of interstitial keratitis, of nodes, or of a symmetrical affection of some of the cranial nerves.

In deciding between the inherited or acquired nature of any case, the points which will aid us are the existence of primary disease of the mother at the time of delivery (which is rare, and can rarely be discovered even if it have been present); the existence of secondary contagious symptoms on either the mother or the nurse who suckled the infant; the presence of notched incisor teeth or of interstitial keratitis, which are peculiar to the inherited form; and the symmetrical distribution of all the secondary and tertiary manifestations, which is asserted by Hutchinson to be also an attribute of inherited as distinguished from acquired syphilis.

Prognosis.—The most unfavorable conditions in inherited syphilis are, the infection of both parents; the appearance of the disease soon after birth, especially in the form of pemphigus; and the occurrence of rapid and extreme emaciation. On the other hand, if the father alone has secondary symptoms, and those of a mild character; if the disease

CLASS VII.

DISEASES OF THE SKIN.

INTRODUCTORY REMARKS.

will be observed that, in regard to some of these affections, we altered the arrangement which was adopted in the earlier editions is book, while retaining the same general divisions of skin diseases: es, papules, vesicular, pustular, and squamous affections. For algh none of the new classifications recently devised, some of them d upon the anatomical element of the skin affected, others upon nature of the pathological process present, and others still upon clinical relations of the various diseases, appear to us completely factory; still the more rigid study of skin diseases has rendered ssary the removal of a number of eruptions from the classes where were formerly placed. We follow then the example of Wilson, etains the original classification of Willan, modified and expanded, ver, so as to harmonize with the results of more recent observa-

class which will be found to have been most changed is that of ar diseases, of which eczema, a disease formerly defined to be erized by the presence of vesicles, was the type. It was long dent, however, that this was not a strictly correct definition, many cases of eczema, other elements of eruption besides the were present. And, accordingly, the term eczema is no longer d to a purely vesicular eruption, but is erected into a generic ll affections which are characterized by redness, itching, infilthe skin, exudation on its surface, and the formation of crusts, he elementary lesion be an erythematous rash, a papule, a a pustule. In accordance with this, as will be seen more in er the head of eczematous affections, this class includes many ome affections, as impetigo, which were formerly classed pustules, and of others which were included among squases.

be worse than useless in a work like the present, which is restricted within certain limits as to size, to attempt a full of all the diseases of the skin to which children are subject. se would compel us to devote to more important matters ections of the skin, a much smaller proportion of space equire and deserve. We shall therefore select only those

e chief point of interest in regard to this form of erythema, as it
ome under our notice, has been the diagnosis between it and scarlet
r. This is to be made out only by recollecting that it has made its
arance in the course of another disease, while the child is already
ring under some kind of sickness, which is not generally the case
scarlatina; by the less scarlet tint of the eruption, its more super-
l character, and more limited extent; and lastly, by its short dura-
.

RYTHEMA INTERTRIGO.—This form of erythema was for a long time,
is still by some, known by the single name of intertrigo. It occurs
the portions of the body exposed to friction by the contact of oppo-
surfaces, and to irritation from the passage over, or retention upon
em, of the urinary secretion or the fecal discharges. The most com-
n seats of it are, therefore, in the folds of the skin about the neck,
the axillæ, the groins, about the anus, in the cleft of the nates, and
the inside of the thighs.

s it appears in the creases of the skin about the neck, or in the axillæ,
ay be a mere red blush lasting a few days, and then disappearing;
fter presenting this appearance for a short time, the inflammation
become much more intense, and occasion an excoriated condition
e surfaces attended with the discharge of a serous or a sero-puru-
luid; or, lastly, the inflammation may run into veritable ulceration,
rise to extensive and very painful ulcers occupying the depth of
ease, presenting abrupt and jagged edges, and discharging very
erable quantities of pus. In these latter forms of the eruption
t be regarded as a true eczema, and, indeed, this form of erythema
en by some authorities transferred to the group of eczematous
ns, under the name of eczema erythematosum. In one child,
nths of age, of delicate constitution, and imperfectly supplied
od, we saw the last-described form of the disease occupying at
e time the groins, the axillæ, and the folds of the neck. The
asted two weeks, and very nearly proved fatal from the violent
it caused. In another child, not quite a year old, who was
, it presented these characters in the neck and axillæ, while in
s it was much less severe, the latter parts being merely exco-

attacked with severe diarrhœa, with dysentery, or entero-
d especially with that form of entero-colitis which so gener-
npanies thrush, are very apt to have an erythema of the nates,
rts, and the internal surfaces of the thighs. So common, in-
is occurrence that M. Valleix regards erythema of these parts
ost constant accompaniment and even precursor of thrush.
wn part we have very often met with it in cases of diarrhœa
even in those of very moderate severity, but we have never
cede the appearance of the intestinal disorder.

n of erythema begins as a simple redness of the skin about
etween the buttocks, about the genital parts, and over the
e upper parts of the thighs. In a mild case of diarrhœa,

nd much shorter duration of the symptoms in erythema. Another im- ortant feature is the peculiar, abrupt, well-defined, and slightly ele- ated margin which marks the edge of the erysipelatous rash, and which loes not exist with the same distinctness in erythema. Lastly, the ingular regularity observed by erysipelas in its gradual extension rom place to place, is altogether unlike the march of erythema, which hows itself suddenly, or in a few hours, over large surfaces, and, after asting some hours or a few days, quickly disappears.

In roseola the peculiar deep rose-tint of the rash will serve to distinguish between it and the lighter red tint of erythema.

The mild character of the general symptoms, and the absence of throat-affection in erythema, will prevent any one who is careful from mistaking the disease for scarlatina.

Erythema intertrigo cannot be mistaken for any other disease, and f the course and peculiar local characters of erythema nodosum be orne in mind, it also may be easily recognized. The only thing with which the latter might be confounded is phlegmonous erysipelas, but if he mild character of the general symptoms in erythema nodosum, the istinctly circumscribed form of the tumors, and the fact that the dis- ase never terminates by suppuration, are recollected, there need be no ifficulty in making the diagnosis.

PROGNOSIS.—Erythema is a very mild disorder in a large majority of he cases. The only conditions under which it proves serious are when he intertrigo attacks children laboring under chronic entero-colitis, or hose affected with severe thrush connected with gastro-intestinal in- lammation, when it cannot fail to increase the sufferings and danger f the patient; or, when it implicates, as we have seen it do in two in- tances, extensive portions of the cutaneous surface, involving the folds f the neck, armpits, groins, and genital organs, and this, too, without ny other signs of disorder of the digestive apparatus than those show- ng functional derangement. In one of these cases the extent and lepth of the ulcerations were so great, and the resulting suffering and onstitutional distress so severe, as to have very nearly destroyed the ife of the infant, who was but two months old at the time of the attack.

Erythema nodosum would almost certainly excite some uneasiness n the mind of a practitioner unacquainted with its real nature and robable course, and not only so, but it would prove tedious and diffi- ult of cure, unless treated in the proper way. When managed cor- ectly, however, it almost always gets well without any difficulty.

TREATMENT.—Erythema fugax requires no special treatment. The lisorder which has occasioned it is the point to which our attention must be turned, and not the eruption, which is a mere consequence.

Ordinary, mild cases of intertrigo require no other measures than attention to strict cleanliness. The irritated parts must be carefully washed two or three times a day, and if the nates, genital parts, and thighs are concerned, the washing must be repeated after each evacuation of urine or stool. After this the parts should be dusted with fine

cleanliness is as important as ever. The application
powders generally employed by the public becomes, unde
stances, insufficient, and often rather injurious, except, i
in which the excoriation is very slight; here the lycop
or very fine starch or magnesia will sometimes answer a
When the excoriation is severe, and when ulceration
have never obtained any good effects from powdering; o
it has often proved injurious, and is at least troublesome
from the incrusting of the powder about the ulcer. We
fore, very greatly, when ulceration is present, to dress
simple cerate, Goulard's cerate, Turner's cerate, or wit
oxide of zinc. The ointment should be applied on a fin
on one side, the rag being doubled and interposed in s
tween the opposite surfaces of inflammation as to be accu
to the whole extent of the disease, and thus prevent all f
contact of the opposite sides. These compresses ought
three or four times a day, and all the discharges gently
washed off by *pressure* with the sponge between each chan

Whilst this topical treatment is being carried out, cons
must be paid to the state of the digestive function.
necessary to apply this remark to cases occurring in
thrush or entero-colitis; but there is another class of
have met with, in which, though the intertrigo is severe
lasting as much as two, three, or four weeks, the signs o
tinal disorder are so slight as to pass unnoticed unless car
into. Thus they may consist merely in the fact that t
few more stools per day than usual, or that the stools a
than they should be, or that they exhibit marks of deran

and slight febrile reaction. The proper treatment is a laxative at the beginning of the attack, and again in the course of the disorder, if necessary; rest in bed, or on a sofa, which is very important; and, after the operation of the laxative, the administration of tonics, and the use of a light but strengthening diet. The best tonic, as a general rule, is quinia. If this is not liked, or if there be anything in the case to contraindicate its employment, we may substitute the compound tincture of bark, in the dose of fifteen or twenty drops, three times a day. If the child is pale and anæmic, iron is the proper remedy. It should be given in connection with the tincture of bark, or with small doses of brandy, when the appetite is poor, and the strength and spirits of the child much below their natural level.

Topical remedies are not necessary as a general rule. When, however, the local symptoms are severe, or there is much heat or pain in the tumors, they should be kept covered with compresses moistened with some kind of mucilage, or with lead-water and laudanum.

ARTICLE II.

ERYSIPELAS.

Definition; Forms; Frequency.—Erysipelas is a specific, acute, febrile, non-contagious exanthem, characterized by a deep red rash, attended with heat and swelling of the skin, sometimes with inflammation of the subjacent cellular tissue, and terminating generally in resolution, but sometimes in suppuration or gangrene. The disease is very variable as to its extent, and has the peculiarity of spreading from place to place, the part first attacked recovering, whilst the neighboring surface is becoming affected.

The disease, as it occurs in children over six months of age, presents the same characters as in adults, and requires therefore no particular attention in this work. In younger children, on the contrary, and especially in the new-born infant, it is different in several particulars from that of older children or adults, and this we shall attempt to describe. The form which occurs in new-born infants, has been technically named erysipelas neonatorum.

Erysipelas is a rare disease in private practice, particularly amongst families in easy circumstances. In lying-in and foundling hospitals, on the contrary, it is of frequent occurrence, and it is not uncommon in hospitals for children and in the children of the poor. We have ourselves met with but four cases of erysipelas in children under six months of age, whilst we have met with seven in older children.

Causes.—The erysipelas of young children almost always starts from some previously existing cutaneous inflammation, the most frequent seats of which are the umbilicus during the process of separation of ace. or upon one of the extremities, without any apparent exciting ause, and extend thence with greater or less rapidity to other parts f the body.

The form of the disease which occurs in very young infants, and vhich is by far more frequent in lying-in and foundling hospitals than nder any other circumstances, begins almost always, at least when of severe type, on the abdomen. It attacks hearty as well as more del-cate children, and is generally very rapid in its progress. The ery-ipelatous surface is at first of a bright red and shining appearance, but oon assumes a purplish hue, and as this occurs, becomes exceedingly ard to the touch, and somewhat, though not very much swelled. As he case goes on, unless resolution, which is a rare event, should take lace, or death occur at an early period, the purple color deepens into vid, vesications occur, the cellular tissue is destroyed, and in many nstances extensive gangrene takes place, so that the scrotum has been een to "become black and slough away, leaving the testicles bare, and anging loose by the cords." (*Maunsell and Evanson.*) In a case that ccurred to one of ourselves in private practice, the disease began on he ninth day at the umbilicus, and involved the soft tissues of the an-erior wall of the thorax and abdomen. The skin sloughed in several laces, exposing the muscles; and at one point, just below the epigas-rium, perforation of the abdominal wall occurred. Death occurred on the fteenth day of the disease. In this form of infantile erysipelas, ex-mination after death almost always discloses severe and extensive per-toneal inflammation, a condition which cannot fail, of course, to add reatly to the danger of the disease.

But infantile erysipelas does not always exhibit these violent char-cters, though whenever it occurs in infants under a year old it must e regarded as a very dangerous affection. When it attacks children ver two weeks or a month old, it usually starts, as has been stated, rom the neighborhood of a vaccine pock, from the inflamed surfaces of ntertrigo or those of eczematous or impetiginous eruptions, or it be-ins without evident cause, as in adults, on the face, or on some part of he extremities. It appears first in the shape of a bright red inflam-nation of the skin. After a short time the erysipelatous surface be-omes tense, shining, very hot, slightly swelled, and painful to the ouch. Pressure causes the color to disappear, but this rapidly returns vhen the pressure is removed. Coincidently with the appearance of he cutaneous redness the child is seized with fever, restlessness, and evere thirst. From the spot first attacked the disease extends rapidly o the neighboring surfaces, from the neck and arms to the head and runk, and from the groins or genital parts to the rest of the trunk and o the inferior extremities. When it begins upon the face, it extends o the scalp, and may thence travel over the whole surface, or it may emain limited, as it often does in adults, to the head alone. In one ase that we saw, in an infant three weeks old, in which it began upon he face, it extended gradually over the whole cutaneous surface, and et the child recovered. In another, two months old, it began upon

As the peculiar inflammation spreads to the neighb
the parts first attacked lose their red color and swellin
a process of desquamation. In some instances, the inf
caused suppuration of the subcutaneous cellular tissu
when the greater part of the surface first attacked has c
the peculiar characters of the erysipelatous inflamma
main behind abscesses of greater or less extent. Thu
cases that came under our own notice, when the erysip
head and thorax, and was confined to the pelvis and in
ties, there were two abscesses on the scalp, and one ove
toral muscle, whilst all the skin between the abscesses
natural appearance, with the exception of the desqua
which was going on as usual. In another, but rarer
inflammation sometimes returns to the parts over whic
passed.

The swelling which accompanies this disease is usuall
tous nature,—the œdema being most marked in the han
upon the face, whilst upon the trunk it is much less co
The general symptoms consist at first, as already sta
dicating a strong febrile reaction. If the case goes on
symptoms continue until the disorder terminates. Bu
ease is severe, and especially when it ends in vesicati
destruction of the cellular tissue, or in gangrene, the ge
are much more violent, marking thereby the gravity
The face and lips become pale, and the tongue and m
child is in a state of constant agitation at first, and expr
ness and suffering by incessant moaning or crying, but
becomes heavy and drowsy from exhaustion. The pulse

result arrived at by M. Trousseau. In one of the cases alluded to by us, in which the disease extended over the whole cutaneous surface, the duration was four, while in another it was three weeks; in the one in which the eruption was limited to the head, the duration was a week. In the seven remaining cases, the disease was limited to the nose and eyelids, or the face and scalp, and lasted from three to ten days.

DIAGNOSIS.—The diagnosis is very easy. The peculiar shade of the red color, the presence of decided though moderate tumefaction of the affected part, the severity of the general symptoms, and the characteristic erratic mode of extension from surface to surface, all assist to render the diagnosis very clear to those who have a proper amount of medical knowledge.

PROGNOSIS.—Erysipelas is always a dangerous disease in young children. The precise degree of danger in individual cases will depend chiefly on two circumstances: first, the age of the subject; and second, the hygienic conditions under which the disease occurs. It is exceedingly dangerous in new-born infants, so much so indeed that M. Bouchut declares that they all die (*loc. cit.*, p. 532). This is in all probability almost strictly true of the cases which occur in infants only a few days old, particularly when they take place in lying-in hospitals, or even in private practice, during the prevalence of an epidemic of puerperal fever. The disease is always very dangerous in hospitals, even in infants over two weeks old. Yet it would appear not to be so grave as represented by M. Bouchut, who thinks that very few indeed have been cured even at that age; for, of thirty cases in infants between one day and a year old observed by Billard at the Foundling's Hospital of Paris, sixteen, or only one more than half, proved fatal. Schwebel reports 54 deaths in 86 cases (*Meissner*, *Kinderkrankheiten*, 3d ed., vol. i, p. 372).

In private practice, erysipelas as it occurs in children between two weeks and a few years old, is a dangerous malady, but yet is far from being so in the same degree as in the new-born infant, and in hospitals. We have already stated that we have seen four cases in young infants; one nine days old, in whom the disease proved fatal in fifteen days; one three weeks old, in whom the disease lasted four weeks, and travelled over the whole cutaneous surface; another ten weeks old, in whom also it travelled over the greater part of the cutaneous surface; and a fourth two months old, in whom it remained limited to the head. These last three recovered. Again, we have seen seven cases of erysipelas of the face or head in children between seven months and twelve years old, and these also ended favorably. It must be recollected, however, to account for these recoveries, that they all occurred in hearty children, and under the most favorable hygienic conditions met with in private practice. To conclude, MM. Rilliet and Barthez report nine cases of erysipelas of the face in children, all of whom, with three exceptions, were over five years of age. Five of the nine cases were idiopathic; in four the disease complicated other affections. All of the spontaneous and one of the complicated cases recovered. The two

others, both of which occurred in subjects laboring under measles
tended with pneumonia, proved fatal.

Treatment.—The treatment of erysipelas in new-born infants, e
cially when the subjects of the disease are the inmates of a hospi
and when it occurs coincidently with a puerperal fever epidemic, is
may be learned from the almost certain fatality of the disorder,
ceedingly hopeless. M. Trousseau (*Barrier, Traité Prat. des Mal.*
l'Enfance, t. ii, p. 560) has made trial unsuccessfully of emollients
every form, of fomentations, lotions, baths, and of ointments conta
ing sulphate of iron. "I have tried," he says, "surrounding the wh
body and limbs with blisters in the form of strips; the erysipelas
passed over the obstacle. I have applied without success blisters u
the surfaces already invaded by the inflammation. I have obtained
advantage from mercurial ointment or from baths containing corros
sublimate." He even tried the application of the actual cautery
points where the disease was beginning, but without effect. So,
with methodical compression.

Underwood says that "upon the complaint being first noticed in
British Lying-in Hospital, various means were made use of with
success; the progress of the inflammation has seemed, indeed, to
checked for awhile by saturnine fomentations and poultices, appl
on the very first appearance of the inflammation; but it soon spre
and a gangrene presently came on; or where matter has been form
the tender infant has sunk under the discharge." He adds that
then proposed bark, to which, sometimes, a little confectio aromat
was added, and that, from that period, several cases recovered. Af
this, linen compresses, wrung out of camphorated spirit, were appl
in the place of the saturnine solution, and proved successful in seve
instances in checking the inflammation. "Nevertheless, the grea
number of infants attacked with this disorder sink under its violen
and many of them in a very few days." (*Treat. on the Dis. of Child*
Am. ed., by Dr. Bell, from the 9th Eng. ed., p. 103.) In a note to
above, Dr. M. Hall states that fomentations of extract of poppies
fused in warm water, and poultices consisting of the same fluid
crumbs of bread, proved beneficial in many instances. Dewees rec
mends the application of a blister, when the erysipelas is so situated
to allow the whole surface of inflammation and a portion of the nei
boring healthy surface to be covered by the plaster. When this can
be done, he prefers the use of the strong mercurial ointment, wh
must be applied over the whole of the eruption, and partly upon
healthy skin, and renewed as often as the part becomes dry.

It is very difficult amidst the variety of advice given by differ
writers, and especially when we reflect upon the great mortality of
disease under every kind of treatment, to determine which to sel
For our own part, we should prefer the use of cooling emollient ap
cations during the first part of the attack, whilst the skin is of a bri
red color, hot, and shining. When the circulation becomes lang
and the color of the eruption is disposed to deepen from red to purp

we should suspend the use of the emollient applications, and employ instead the lotion of camphorated spirit recommended by Underwood; the camphorated tincture of soap, which we have known to be of great service in the erysipelatous inflammations occurring in patients of broken down constitution, and which is to be applied three or four times a day by means of a soft sponge; or lastly, we would make trial of Kentish's ointment, a remedy found of great service by the late Dr. Charles D. Meigs, in the erysipelas of children (*North Amer. Med. and Surg. Journ.*, vol. vi, p. 77). This ointment he prepared by rendering basilicon ointment soft (not fluid) with spirit of turpentine. It is rubbed upon the inflamed part with the fingers, the anointing being "repeated often enough to keep the part always very thinly covered." The internal treatment should consist in attention to the state of the bowels, which are to be kept soluble by the mildest laxatives, without being purged, and in a resort to tonic and stimulating remedies upon the very first approach of symptoms indicating exhaustion. The best remedies of this class are proper diet, wine whey, small quantities of brandy, and bark in connection with minute doses of carbonate of ammonia.

In addition to these, the tincture of the chloride of iron, whose remarkable and almost specific influence upon the course of erysipelas in more advanced life is so well established, should be given in large doses, proportioned to the tender age of the patient. Thus we may give two or three drops every three hours to an infant of a month old, as in the following formula:

℞.—Tr. Ferri Chloridi, ... fʒss.
Acid. Acetic Dil., ... fʒss.
Liq. Ammoniæ Acetat., ... fʒj.
Syr. Simp., ... f℥ss.
Aquæ, ... ad f℥iij.—M.
S.—A teaspoonful every three hours.

When the inflammation has gone on to the production of subcutaneous suppuration, it becomes still more important to sustain the forces of the constitution, by giving the infant a healthy and abundant breast of milk, and by the internal use of brandy in small quantities, of bark, or better still, of quinia in combination with small doses of carbonate of ammonia. At the same time the suppurating surfaces must be well fomented, and dressed with warm poultices, and, when necessary, laid open by careful incisions, observing the precaution to cause as small a loss of blood as possible. If the case occur in a hospital, or in a child placed in unfavorable hygienic conditions, let the following statement of M. Barrier (*loc. cit.*, t. iii, p. 562) be borne in mind: "However much the life of an infant be threatened by erysipelas, if we can but persuade a wet-nurse to take charge of it, the pure air of the country is often seen to replace most advantageously all other therapeutical resources."

As the preceding remarks have been restricted to the form of the

as may be required to keep the bowels soluble whe
such as shall correct acidity or diarrhœa when eith
those which promote an open state of the skin, and a
the urinary secretion. For the latter purpose we
than the solution of the acetate of ammonia, and t
nitre, about twenty or thirty drops of the former,
latter, in sweetened water, to be repeated every tw
The tincture of the chloride of iron should also be gi
nation before recommended, in large doses, as three t
three hours, at the age of one or two years. Should
tended by any symptoms of prostration, or at a later
ease, when the child begins to emaciate and grow fe
must be carefully supported by the use of proper diet,
and tonics. The only proper diet for nursing child
breast-milk: for those who have been weaned, the di
of preparations of milk, light animal broths, or bee
stimulants are five or ten drops of brandy, five drops
of hartshorn, or a quarter or sixth of a grain of carbo
in weak syrup of ginger, to be administered four or fi
more frequently, when the forces of the child are g
The proper tonic is from a quarter to half a grain o
or half a grain of quinia, in some suitable vehicle, ev
hours.

The best local treatment is, in our opinion, cooling
applications, as slippery elm bark, marsh-mallow, or fl
the first few days, whilst the reaction is marked, and
of the body high. Somewhat later, when the strengt
duced, and the color of the eruption to deepen, we

moderating the severity of the general, and especially of the nervous symptoms.

In children over two or three years of age, erysipelas must be treated on the same principles as in adults, by light but nourishing diet, and rest in bed, by the internal use of laxatives occasionally, of full doses of the tincture of chloride of iron, and of febrifuges, and by the external application of emollient infusions, so long as the symptoms remain acute and the strength unreduced. But when, after a time, the fever begins to subside, or the child begins to show signs of debility and a tendency towards the typhoid condition, we must endeavor to maintain the life-actions in a proper degree of energy by a more nourishing and abundant diet, by the prudent administration of bark or quinia, and even by the use of brandy and ammonia, should the strength of the patient be disposed to give way suddenly or rapidly. Under these circumstances, moreover, the best local application will be either the Kentish's ointment, or the camphorated tincture of soap.

ARTICLE III.

ROSEOLA.

Definition; Synonyms; Frequency; Forms.—Roseola is a non-contagious, fugacious exanthem, characterized by rose-colored patches, of irregular size and shape, which are unaccompanied by elevations or papules, and the appearance of which is preceded and accompanied by febrile symptoms.

It is often called in this country scarlet rash, and under that title supposed to constitute a very mild form of scarlatina. It is sometimes called also French measles, and rubeola sine catarrho.

Roseola is of rather *frequent* occurrence amongst children, though more rare than either measles or scarlet fever.

There are three *forms* of the disease met with in children, roseola æstiva, roseola autumnalis, and roseola annulata. As the two former, however, present no differences of any importance, we shall describe them under one head, whilst the latter, quite unlike the other two, requires that we should describe it apart.

Causes.—Roseola may occur at all *ages* of infancy and childhood, and at any *season*, but is most common in summer and autumn. It has been known to prevail as an *epidemic*, but has never been thought *contagious*. It may attack the same individual on several different occasions, one attack not preserving from repetitions. The variolous eruptions are sometimes preceded by roseola, and in some children it makes its appearance on the ninth or tenth day of the vaccine disease. Of the various causes that we have known to produce it, the most frequent is

in the course of a single night, covering the trunk or
surface with numerous patches, nearly circular in shap
broad, and waving lines, situated close together and
of a light rose color. In another, and rather more vio
ring especially during dentition, the eruption appear
fever, diarrhœa, and slight nervous symptoms, or poss
convulsions, with the characters above mentioned, exc
is deeper in color, greater in extent, and that it lasts g
time—two, three, or four days. Again, in a yet more
roseola æstiva and autumnalis, the disease is preceded
toms which it is important to note. It begins with m
ness, alternating with heat, with loss of strength and s
ache, restlessness, sometimes mild delirium, and even,
we have never seen them, with slight convulsive phe
same time there is some febrile reaction, marked by a
heat and dryness of the skin, thirst and loss of appeti
function is shown to be deranged by the presence eith
or diarrhœa. After these symptoms have continued fo
or even six or seven days, the eruption appears first u
neck, whence it extends in twenty-four or forty-eight
of the body. The rash resembles very closely, in son
that of measles. It is in the form of irregularly cir
large patches, at first of a red, but soon changing to a
and separated from each other by portions of healthy
tion is sometimes accompanied by itching, and somet
pain, and the febrile symptoms generally continue, th
in degree, after the appearance of the rash; while in
the fever disappears entirely from that moment. Th

This variety of roseola appears in the form of rosy rings, or circles, whose centres retain the natural color of the skin. The favorite seats of the eruption are the abdomen, loins, buttocks, or thighs, or it may cover the greater part of the body. In one case that we saw, the eruption covered the face, neck, and trunk. In another it was seated upon the face, trunk, and upper extremities. The rings are at first not more than one or two lines in diameter, but they enlarge gradually until their centres measure as much as half an inch in diameter. In some instances two or three rings surround one another, the skin in the intervals between them still retaining, however, its natural appearance. The disease is, when accompanied by symptoms of reaction, usually of short duration. The cases which occurred to ourselves lasted only three days, and were accompanied by decided febrile symptoms, together with signs of digestive derangement. It sometimes assumes a chronic form, the eruption fading in color in the morning, and increasing again and causing heat of skin, in the evening.

DIAGNOSIS.—Roseola æstiva might be readily mistaken by a careless observer for measles or scarlatina, and especially for the former. We have no doubt whatever that cases of roseola are often regarded, under the title of scarlet rash, as examples of a very mild form of scarlatina, a misapprehension which will explain some at least of the supposed instances of second attacks of scarlet fever in the same individual. This is a mistake, however, that ought not to occur, and need not, if the following characters of the two diseases are properly understood. The rash in scarlatina is, in the first place, of a much brighter tint, and it is more persistent and more uniformly spread over the surface than in roseola. When we come to analyze the characters of the two eruptions, there are other distinctions between them which assist greatly in making the diagnosis. In scarlatina, the eruption is composed of very large patches, or it is absolutely uniform, and evenly distributed over large surfaces, as over the whole trunk, or over the flexor or extensor aspects of the limbs. It is seen to be composed, too, when minutely examined, of an aggregation of very minute red points, which are dotted so closely together, as to present the appearance of a general scarlet blush. In roseola, on the contrary, the rash is composed of irregularly circular, crescentic, or waving patches, with portions of skin between of a natural or nearly natural color. The patches, moreover, are of a different tint from that of scarlatina, being of a deep rose, instead of a bright red or scarlet color, and they cannot, upon close examination, be resolved into the minute dotted points which make up the scarlatinous eruption. When we add to these circumstances the facts, that in roseola there is no faucial inflammation, that the pulse has not the great frequency almost invariably present even in very slight cases of scarlet fever, that all the general symptoms are much less strongly marked, that no desquamation takes place in roseola, and that the duration of the attack is much shorter, we think we have points of difference between the two, quite numerous and marked enough, to render the differential diagnosis easy to a careful observer.

ongst children in a mild shape. We have seldom seen in early life abundant and severe eruption covering the greater part of the sur- e, which is met with in adults.

The most common *form* of urticaria in adults is well known to be the *icaria febrilis*, which is an acute disease of short duration. Two ner forms of the disease, the *urticaria evanida* and *tuberosa*, are occa- nally met with in adults, though they are both rare. In children, far the most frequent form of the disease that we have seen is one which there is scarcely any fever whatever, and in which the erup- n is moderate; the urticaria febrilis is, however, not at all uncommon early life, while, on the other hand, we have never met with an in- nce either of urticaria evanida or tuberosa at the age referred to.

CAUSES.—Children possessing a fine and delicate skin, especially ien they are at the same time endowed with a highly nervous tem- rament, are particularly predisposed to attacks of urticaria. The ly other causes that we are acquainted with are the functional dis- ders of the digestive apparatus which occur in the spring and summer sons, the influence of dentition, derangement of the gastric functions m the use of improper food, and lastly, the ingestion of certain ar- les of diet, which have been proven by long experience to be apt to casion attacks of the disease. Of the articles last referred to, those ich most frequently produce this effect are crabs, the eggs of certain nds of fish, certain crayfish, and some kinds of smoked, dried, or lted fish.

Some children are exceedingly liable to the appearance upon differ- t parts of the body of a few patches of urticaria. Very slight dis- rbances of the gastric functions, a very warm day, or excessive othing, will occasion in such subjects an attack of the disorder; whilst many others again, the disease is never seen under any circum- ances, or only at rare and long intervals.

SYMPTOMS.—The form of the disorder most commonly met with in ildren, in which there is neither fever nor other marked signs of dis- der of the general health, is the disease generally described under e title of *lichen urticatus*, but which ought, it seems to us, to be con- ered as one of the varieties of urticaria. This eruption consists of rge inflamed papules, which are irregular in shape, being either unded or oblong, projecting most in the centre, and which appear ddenly, without any or with only slight prodromic symptoms. The pules are of a bright red color, excepting in their projecting central rtions, where they are whitish or of a very pale red tint. The erup- n is accompanied with a smarting and burning pain, and with the ost violent and annoying itching, which the child endeavors to allay frequent and often rude scratching. It is very fugacious in its aracter, appearing suddenly, lasting for a few hours or several days, d then disappearing entirely, or recurring again after a short time the same or in new places. It terminates finally, after from a few ys to several weeks, by resolution or by a slight furfuraceous des- amation. The most common seats of the eruption in children are shape, and color of the solid elevations of which the patches consist, the violent itching and burning which accompany it, and its fugacious character, render it unlike any other cutaneous disease, and ought to prevent any mistake as to its nature.

PROGNOSIS.—Urticaria is probably never dangerous in children. If it be accompanied by symptoms of a threatening or alarming character, these are dependent rather upon the gastric disorder, which is the cause of the urticaria, than upon the latter affection itself. We have never known it to be more than troublesome and annoying.

TREATMENT.—There are but two really important indications for the treatment of this disease: to attend to the state of the digestive functions, and to allay, by proper means, the distressing irritation occasioned by the itching and burning of the eruption.

In the mild form of urticaria, called in the nursery, "hives," and in scientific language, lichen urticatus, the only treatment necessary is careful regulation of the diet, and the use of means proper to correct any evident derangement of the digestive functions. The food should be light and digestible, but at the same time nourishing. Milk, bread, light meats, and the plainest vegetables, form the proper diet for children over three years of age. Under that age, milk preparations, bread, and in those over a year old, light broths, ought to constitute the diet. In a large majority of such cases, no drug whatever ought to be given. The only ones likely ever to be required are occasional mild laxatives or gentle mercurials, when constipation is present, and some of the antacids, as very small quantities of magnesia or carbonate of soda, or lime-water and milk, when the stomach is acid. To allay the itching and consequent restlessness of the child, the patches of eruption should be well and frequently dusted with toasted rye or wheat flour, which are often very successful. Washing the eruption with salt and water, when the cuticle is not broken, is sometimes very soothing, and, when the patches are of small extent, this may be done without any impropriety. Dr. Watson speaks well of a lotion ("first recommended by Wilkinson"), composed of a drachm of carbonate of ammonia, a drachm of acetate of lead, and eight ounces of rose-water.

In the urticaria febrilis the treatment must depend upon the cause of the attack. When it follows upon the eating of some unwholesome food, we must rid the stomach of the offending substance by an emetic, unless nature has already caused its rejection by spontaneous vomiting. When this end has been gained, it will be proper to give some kind of cathartic medicine, and the best is castor oil, as the mildest and most certain, in order to insure the discharge of the whole of the aliment which has been causing the mischief; or small doses of blue pill; or hydrargyrum cum cretâ, with rhubarb, where there are present any signs of hepatic derangement. After this the only treatment necessary will be the use of cooling and demulcent drinks, containing perhaps a little sweet spirit of nitre; rest in bed, or at least seclusion in the house, for a few days; and careful regulation of the diet. The latter ought to be very light during the continuance of the eruption, consisting merely

Eczema is also divided according to its course, duration, and stage, o acute and chronic.

Eczema shows, moreover, an especial tendency to attack certain parts the surface, and presents various peculiarities in the different locali- s; in children, it frequently occurs on the scalp and face, though it tends over the entire surface of the body far more frequently in them an in adults.

The special forms of eczema which will be here described, are simple ute eczema; eczema of the scalp, and of the face; eczema pustulo- m, or impetigo; eczema papulosum; and chronic eczema, or eczema amosum.

Causes.—The causes of these affections are, to say the least, very scure in most cases. It is probable that some peculiarities of con- tution predispose to it, and particularly the lymphatic temperament, the scrofulous or tubercular diathesis. Exposure to unhealthy gienic conditions, as want of cleanliness, insufficient or improper food, d crowded or ill-ventilated habitations, also render the system more one to the development of eczema.

In those who are thus predisposed, any trifling irritation may prove ficient to provoke the eruption. One of the most common and un- ubted of these is the influence of the process of teething, and the jority of cases of eczema in children occur during either the first the early part of the second dentition. In like manner the applica- n of irritants of any kind to the skin, or the inflammatory action up by vaccination, may serve as an exciting cause. It is remark- le, also, what slight irregularities in diet, or alterations in the quality the mother's milk, will, under such circumstances, induce an attack. deed, the use of artificial food in infancy, by disordering the diges- e function, and impairing nutrition, may be regarded as a frequent se of the disease.

Symptoms.—We have already alluded to the fact, that in the eczema young children, as indeed is true, to a less degree, of the disease at ages, we constantly meet with the most varied forms of eruption the same case; and have the opportunity of watching the develop- nt of papules, vesicles or pustules, until a case which has begun as of erythematous eczema, presents the characters of the papular, icular, and ultimately of the pustular form. The predominance of or the other of these typical forms of eczema is determined by the nperament and general condition of the child, and the grade of in- mmatory action present.

Eczema simplex, or *vesiculosum*, may occur on any part of the body, in children is most frequent on the face and arms. The eruption pears, without any precursory symptoms, as an erythematous patch, ich is red and itchy, and may present slightly raised pimples, and ng rubbed and scratched, soon presents the formation of numerous, sely aggregated, exceedingly minute vesicles, containing a transpa- t limpid serum. After a short time the contained fluid becomes bid and then milky, and is either absorbed, while the vesicles shrivel which the pustules forming the eruption are arranged. From the reater frequency and severity of the disease, however, as it appears pon the scalp in young children, it has become customary to describe , when seated upon that part, under a different title.

Eczema capitis is often met with in infants at the breast during the rst dentition, and at later periods of childhood, in those who are scrofu-ous, or who are placed in unfavorable hygienic conditions. It may be onfined to a small portion of the scalp, or it may cover the head, and xtend to the face and neck; or again, it may be limited entirely to he latter localities, when it constitutes eczema of the face. In both ases, the eruption is very apt to run into the pustular form, constitu-ing the disease known as impetigo capitis.

When mild in its features, it consists of an eruption of numerous mall vesicles or sero-pustules, spread over certain portions of the scalp, o which it may remain limited; or it may cover the face at the same ime, or it may attack alone the forehead, temples, and, perhaps, por-ions of the cheeks. It is attended, under these circumstances, with ery slight redness and heat of the integument. The sero-pustules dis-harge their fluid contents and form thin crusts, which gradually fall ff, leaving slightly reddened or excoriated surfaces, which soon disap-ear, or are followed by fresh crops of eruption, destined to pass through e same changes as the preceding ones.

In more severe cases the disease may be confined either to the scalp face, or it may, as stated above, exist upon both simultaneously. he eruption presents different appearances in these two situations.

When seated on the scalp, it is often called by the English milky ust or milk-crust, crusta lactea, tinea lactea, and porrigo larvalis; d by the French, croûte de lait and gourme.

On the scalp, as already said, the eruption may be either partial or neral. It may consist at first of disseminated minute vesicles, which eak, and form thin, lamellated crusts, of a yellowish or brownish lor; or of pustules, yellowish-white in color, and of small size, seated an inflamed base. The surface affected is at first small, but the uption gradually extends to surrounding parts. It is attended with reat heat and itching; and, as the disease advances, the scalp be-mes very much inflamed, red, tense, swollen, and painful. The erup-on is now more completely pustular, and as the pustules open or are rn by the uncontrollable scratching, they discharge an abundant thin ro-pus, or even a thick and viscid fluid, which glues the hairs to-ether, and hardens into uneven brownish-yellow crusts. If the scalp not kept clean by constant washing or by emollient applications, the usts increase rapidly in thickness by successive discharges of fluid om the pustular surface beneath, until at length the whole of the dis-sed part is covered with thick, heavy, rough, and adherent crusts, of brownish or yellowish-white color, or at times of a positive black om the admixture of blood which oozes from the inflamed surface, rn by the nails of the little sufferer.

When neglected, the crusts become more and more thick, and from

the heat of the head and exposure to the
composition, and exhale a fetid, sickening
kind. Among the children of the poor an
abundance, and add to the repulsive chara
the crusts are somewhat soft and moist, f
them of the fluid exuded beneath; but as
and thicker, their outer surface becomes
able. The secretion from the inflamed s
under the crusted mass above, and, flowing
behind the ears, irritates the parts that w
extends the disease.

When the crusts are removed by any m
tion is found to be red, shining, wet, and d
lent or sero purulent fluid, which escapes fr
dotted thickly over the inflamed scalp. T
tumefied, tender to the touch, and abscesse
lymphatic glands, as the occipital, submenta
enlarged, and at times suppurate.

When the disease has lasted a consider
to assume a chronic form. The inflamm
hair-follicles, and often occasions partial
smaller surfaces. This kind of alopecia i
The hair-bulbs are not destroyed, but mere
grows again after the cure of the disease.
main thickened, but the amount of the se
painful irritation and itching are less tro
cumstances, the crusts are less thick and m
thinner, and are more easily detached. T
and rough, and there is a continual desqu
particles, constituting a form of pityriasis
of various sizes, resembling a case of psori

On the *face* (*Eczema faciei*), the disease
the forehead and cheeks, to which parts
whence it may extend to the lips, chin, ea
eyelids are seldom attacked, though we hav
eyelids slightly affected.

The disease begins by the appearance of
tules on a patch of reddened and slightl
excessive pruritus. When the eruption is
and the degree of inflammation slight, the
a discharge of a thin, turbid, serous flui
scales, or thin lamellated crusts.

When the accompanying inflammation
eruption is more truly pustular, the pustule
large, and the discharge copious, so that
is not interfered with by topical applicati
the child, large portions of the affected s
thick yellowish, brownish, or brownish-re

general appearance of a mass of incrustation, broken by cracks and fissures into portions of very irregular size and shape.

In the milder cases, when the scales drop off, the skin may appear reddened and moist, or may seem to be covered with a very delicate, shining epidermis, which is perfectly dry or presents tiny drops of serum or minute cracks. In the more severe cases, if the crusts are detached from any cause, the skin beneath appears red, swollen, inflamed, and wetted with a more or less abundant sero-purulent fluid, sometimes mixed with blood, that oozes from numerous small points on the excoriated and inflamed surface. The eruption is attended with severe itching and smarting, to relieve which the child often tears the affected surface with the nails, so as frequently to remove the crusts, wound the skin beneath, and cause more or less bleeding from the part.

In this more severe form, when the discharge forms a thick discolored scab covering the scalp or face like a mask, the disease has received the names of porrigo or impetigo larvalis, which are less accurate than eczema larvale. It corresponds to the impetigo figurata, as met with in other parts of the body.

When the eruption is more scanty and developed in small groups on the scalp alone, the discharge is less copious, and soon concretes into dry, friable, brownish crusts of irregular shape, some of which are very adherent, matting together a larger or smaller number of hairs, while others are broken into small and dry fragments, which have been compared to particles of mortar dispersed among the hair. Many of the pustules in this variety are formed at the base of the hairs, so that these particles of crust, being pierced by the hairs, have somewhat the appearance of a string of rude beads. This form of the disease has been known as tinea, or impetigo, or porrigo, granulata; but for the sake of uniformity, it might be styled eczema granulatum. It corresponds to the impetigo sparsa, as met with on other parts of the body.

Eczema larvale, whether confined to the scalp or face or existing on both parts at once, causes, when it exists in the acute form, much distress and annoyance to the child. The heat and tension of the part, and particularly the itching, occasion much restlessness and irritability; they make the child cross and peevish, disturb its sleep, and sometimes cause slight febrile attacks, which debilitate and injure the health. Indeed, when the disease has lasted a considerable time, it often induces extreme anæmia and impairs severely the general nutrition of the child. In other cases, however, the general health remains perfect,—all the functions of the body going on well, notwithstanding the local distress and irritation. The lymphatic glands situated behind and in front of the ear, and those on the back and front of the neck often inflame, enlarge, are frequently hard and painful to the touch, and in a few instances suppurate, though the latter occurrence is not frequent.

The *duration* of eczema larvale is very variable in different cases. Mild cases, and particularly those in which the eruption is confined to a limited extent, often get well, or are readily cured in two or three months. When, on the contrary, the disease is severe and extensive, on the extremities, being not unfrequent in children, according to Wilson, on the hands and feet.

The eruption appears as small yellow pustules, seated upon an inflamed base, and attended with more or less itching. The patch frequently presents a surrounding circle of confluent vesicles or phlyctenæ. The pustules soon break and discharge a sero-purulent fluid, which hardens into a rugous, more or less projecting, friable crust, seeming to consist of different layers superimposed one upon the other. When the crusts fall, or after their removal by topical means, there remains beneath an inflamed surface, which may be either excoriated, giving issue to additional fluid and a renewal of the crusts, or dry, and disappearing little by little by the gradual fading away of the red color of the spots.

Eczema Chronicum.—Eczema infantile, if left to itself, has no natural tendency to cure, but usually becomes chronic, as in the adult.

When the disease passes into this form, no matter what may have been the original type of the eczema, the eruption gradually assumes uniform and characteristic appearances. The various forms which have already been described are then to be regarded as varieties of acute eczema, while the chronic form is common to them all, and represents the condition into which all the acute varieties may merge.

The skin in chronic eczema is either very much inflamed and thickened, presenting excoriations with deep cracks and fissures, which pour out an abundant ichorous secretion, or, more frequently, the inflammation is less severe, there being much less heat, redness, and infiltration of the skin, fewer excoriations and cracks, and a smaller amount of effusion. The affected surface is, in these cases, dry and parched, and constantly throws off a fine furfuraceous desquamation, as in pityriasis, or scales of dried cuticle of various sizes, as in psoriasis.

This form is most common on the scalp, behind the ears, about the neck and upper part of the trunk, and in the flexures of the joints. It usually lasts for months, and is difficult of cure. It is attended with severe itching, which is sometimes so troublesome as to occasion the most distressing and uncontrollable restlessness at night.

Not rarely also, on the application of any exciting cause, the eruption will spread from the spots where it has been lurking in the chronic form, and invade more or less of the surface, assuming all the appearances of acute eczema.

DIAGNOSIS.—It must be borne in mind, in making the diagnosis of eczema, that its characteristic symptoms, which are present in varying proportion in nearly every case, are redness and infiltration of the skin, attended with marked itching; and exudation on the surface, with the formation of crusts.

Eczema simplex when seated on the hands and between the fingers, may be mistaken for scabies. The distinction can, however, be made by attention to the following points: the vesicles of eczema are flattened and aggregated; in scabies they are acuminated, isolated, and entirely distinct. There will also be frequently found, in scabies, vesiment. It is necessary to remove the constitutional disturbance which may be the essential cause of the affection, to allay the local distress, and to promote the healthy vigorous nutrition of the skin. These principles, which guide the practice of most dermatologists, are especially insisted on by Mr. Erasmus Wilson, who gives to *elimination* the first place; to *alleviation of local distress* the second; and to *restoration of power* the third. There are, however, some high authorities who regard the constitutional treatment in cases of eczema as of very secondary importance, and rely almost exclusively upon local measures. Our own observation has convinced us that the most rapid and certain cures can only be effected by a judicious combination of general and local remedies, either of which, however, may, under special circumstances, assume peculiar and paramount importance.

The general treatment of eczema must depend on the state of health of the patient at the time, on the extent and activity of the eruption, and on its acute or chronic character.

In mild cases which show but little disposition to extend, and are not attended by much irritation, regulation of the child's diet, and the use of the most simple bland applications, will be sufficient.

When the disease is more extensive and attended with much irritation, it is necessary to examine carefully into the state of the digestive function, and if this be in any way disordered, to endeavor to restore it to a more healthful condition.

When the child is teething, the gums ought to be examined, and, if found swelled or inflamed, they should be lanced as often as necessary. The diet must be properly regulated, the food being changed if that which has been previously taken is found not to be well and completely digested.

Constipation, if it be present, must be overcome by altering the diet, or by the administration of rhubarb, small doses of magnesia, Rochelle salts, or sulphur. Purgatives have been strongly recommended by some writers in the treatment of eczema pustulosum, but we should advise their use only when constipation is present, and in hearty, vigorous children. In most cases, the gentlest laxatives, given merely to regulate the bowels, are to be preferred.

If there are evidences of acidity of the stomach, it is well to employ some of the various preparations of the alkalies.

So also when diarrhœa is present, it should be treated by attention to the diet; and by the administration of a weak castor-oil emulsion, containing small quantities of laudanum, when the stools are feculent, but small, frequent, and attended with griping; when they are thin and watery, greenish, and composed in part of mucus, the following prescription will often prove very useful:

℞.—Tr. Krameriæ,	fʒj.
Tr. Opii,	gtt. vj.
Sodæ Bicarb.,	℈j.
Syrup Zingib.,	fʒvij.
Aquæ,	f℥ij.—M.

S.—A teaspoonful two or three times a day, for children of one and two years old.

be given in combination with the compound syrup of sarsaparilla, in the dose of from gtt. ij to gtt. v of the former, diffused in from a quarter to a half teaspoonful of the latter, three times a day, for children of one or two years of age.

It is recommended by some authors to administer calomel in considerable and frequently repeated doses in severe eczema. Mr. E. Wilson advises 1 gr. of calomel rubbed down with 1 gr. of white sugar or sugar of milk, as the dose for the youngest infant; for a child one year old, a grain and a half; for a child two years old, 2 grains; this dose being repeated once a week or oftener, according to circumstances. We have not, however, found any necessity for employing calomel as an element of our regular treatment, resorting to minute doses of it or of blue pill only when the stools are whitish or clay-colored and offensive; under which circumstances it has almost always been productive of good effects.

The diet should be nutritious and strengthening, but, at the same time, light and of easy digestion.

If the appetite is weak and capricious, tonic remedies, as tincture of bark, or quinia, in combination with the ferruginous preparation employed, ought to be administered.

In rare cases, where the patient is of full habit, of gross development, and of florid complexion, the diet must be somewhat restricted, and a moderate use of cathartic remedies, as small doses of saline laxatives, of blue pill and extract of taraxacum, or of sulphur, resorted to.

Local Treatment.—In mild cases, when the patches of eruption are small, and with very little disposition to extend, and the degree of inflammation is slight, a cure may often be obtained with great ease by the application, twice or thrice a day, of an ointment composed of one part of ung. hydrarg. nitratis to three or four parts of simple cerate, or lard; of weak tar ointment; or of the benzoated oxide of zinc ointment, as recommended below; or it may even be sufficient simply to wash the eruptive patches with cool water several times a day, and to anoint them in the evening with ointment of cucumbers.

When the disease is attended with much irritation, the application of compresses repeatedly wet with cold water, or with some emollient decoction, as of marshmallow root, flaxseed, sassafras pith, or slippery-elm bark, or the use of warm bread and water poultices, are frequently of the greatest service in reducing the heat and irritation, and arresting the progress of the eruption.

The compresses must be repeatedly wetted with the cool applications, to prevent the temperature of the liquid from being raised by the heat of the body. They may be retained upon the part for several hours at a time, or throughout the day, as they may be found to suit the eruption, and during the night may be substituted by a dressing of benzoated oxide of zinc ointment.

When warm, moist applications, as poultices, are employed, they should always be covered with oiled silk to prevent them from drying.

employed for such purposes. One of the best is that made of stale bread and water, with the addition of a little washed lard or hot almond-oil to keep it soft. The water is preferable to milk, as the latter often sours soon after being applied. Another excellent poultice is one made of ground slippery-elm bark, mixed with a little flaxseed or Indian meal, to give it a slightly greater consistence. Each poultice may be allowed to remain on the part for three or four hours.

After the crusts have been entirely removed, and the inflammatory condition diminished by means of the emollient applications above recommended, the latter may be dispensed with entirely, or during the greater part of the day; or they may be used only during sleep, at which time they are usually best submitted to by the child. At this stage of the disease it becomes proper to make use of different lotions and ointments intended to modify the action of the diseased skin.

The number of local remedies recommended in the books for eczema in its various forms is, however, so enormous, that we shall refer only to those which we have ourselves made trial of and found useful, or which come from such sources as entitle them to our attention.

The choice between the use of lotions or ointments must depend very much upon trials made in each particular case, since it will be found that some are irritated by all, even the mildest ointments, and bear lotions only, while in other instances exactly the opposite occurs.

Amongst the lotions, the most soothing and beneficial are a weak solution of borax containing morphia; weak lead-water; a sulphuro-alkaline lotion, as the following:

℞.—Potass. Carbonat., ...	ʒss.
Sulph. Sublimat., ...	ʒj.
Aquæ Fluvial., ...	f℥viij.
Ft. Sol.	

Or weak solutions of bichloride of mercury, gr. ss. to f℥j, as Van Swieten's liquor:

℞.—Hydrarg. Chloridi Corros., ...	gr. xviij.
Alcohol, ...	f℥iij.
Aquæ Destillat., ...	f℥xxix.
Ft. Sol.	

These lotions may be applied on pledgets of lint wetted with them, or, if such prolonged applications prove irritating, they may be used by merely washing the part with them for a quarter of an hour each time.

We have ourselves usually found that ointments afford more relief in such cases, and the one which we think the most appropriate, is the ointment of the benzoated oxide of zinc, rubbed down with a little alcohol. Among the other ointments highly recommended, are those containing oxide of lead or calamine; or citrine ointment, diluted with two or three parts of simple cerate.

When the eruption is confined to a rather small surface and is not *rry applications* also are among the most useful in the chronic form zema. They may be made in the form of ointments, as the offici- ar ointment, or the following, recommended by Rilliet and Barthez ccessful in their hands:

℞.—Vini Opii, ... f℥ss.
Picis Liquidæ, ... ℈vjss.
Axungiæ, ... ℥j.—M.

they may be combined with an alkali, as soft soap, as is done in ra's tinctura saponis viridis cum pice; which is made by adding part of tar to three of the spiritus saponatus kalinus.

he tarry ingredient in these may be either *common tar; oil of cade* m cadinum, huile de cade), a product of the dry distillation of the d of the *juniperus oxycedrus; oleum fagi,* obtained from the beech; *eum rusci* or *betulæ,* which comes from the bark of the *betula alba.*

hen used in the form of soap, it should be rubbed firmly over the ted surface, or even be allowed to dry on.

he forms of *mercury* best adapted to this stage are the nitrate, the iodide, and the mild chloride, which may be combined with lard in rger proportion than that recommended for an earlier stage of the ase.

cases of eczema tarsi, attended with infiltration of the eyelids, all Anderson recommends that the eyelashes should be extracted, eyelids everted and a solution of caustic potash gr. v or x to f℥j ap- l and quickly washed off by a large brush. Care should be ob- ed in case the edges of the eyelids are adherent in the morning, to separate them rudely, but to moisten them with tepid water or and water, so as to soften the crusts. Afterwards an application itrine ointment, diluted with about two parts of lard, should be e along the edges of the lids night and morning.

ARTICLE II.

HERPES.

EFINITION; VARIETIES; FREQUENCY.—Herpes is a non-contagious neous disease, characterized by an eruption of vesicles assembled roups on inflamed surfaces, of irregular size and shape, which are rated from each other by perfectly healthy portions of skin. The ase is usually acute in its course, seldom lasting more than two or e weeks, but it is not, as a general rule, accompanied by any severe titutional symptoms. The separate vesicles composing the erup- last about ten days, and then disappear by the absorption of their ents, by the drying up of the contained fluid without rupture of the

rieties we shall describe, as of importance in childr
tenodes, *zoster*, and *iris*. Herpes circinatus, formerl
group, will be found described in the article on tine

HERPES is quite a frequent disease in children, th
any considerable importance.

CAUSES.—The causes of herpes are often obscure
in many cases entirely inappreciable. The disease i
persons who possess a delicate and irritable skin.
and most clearly ascertained cause is some disturba
functions, and when there exist, in connection with
tations or inflammations of the respiratory mucous
pecially apt to be developed. Herpes phlycten
exposure to a hot sun, while herpes labialis is freque
posure to a cold wind, especially when this occurs
leaving a heated room. The latter variety also freq
coryza, angina, and stomatitis, and appears often as
in the course, and particularly at the termination,
and visceral inflammations.

The usual exciting causes of the disease are irregu
posure of the body while in a heated state to cold a
tants, malarial disease, and bilious disorders of all k

HERPES PHLYCTENODES.—This variety of herpes,
forms of the disease, may appear upon any part of
face, and does not assume a determinate shape. It m
upon several parts at the same time. It is usually,
upon the upper parts of the body, and particularly
chest, and arms. It is rare to observe it on the low

We believe it to be a rare affection amongst the c flamed surfaces, of an irregular or rounded shape, dotted over with projecting, globular vesicles, which are hard, resisting, and, on the first day, transparent, but which become, in the course of a day or two, turbid or lactescent. The red color of the eruptive patch generally extends a short distance beyond the vesicles: the integument between the different patches retains, however, in all cases, its healthy color and character. A sense of smarting and itching accompanies, as well as precedes, the eruption. On the second day of the eruption, the number of vesicles gradually increases, and they become full and distended. About the third or fourth day, the vesicles have become very turbid, and they begin to shrink. About the seventh or eighth day, they are usually transformed, by the drying up of their contents, into thin, brownish crusts, which fall off by desquamation about the tenth or twelfth day. There also remains, for a few days after the disappearance of the eruption, some redness of the surface, which subsides little by little.

This variety of herpes is never accompanied by constitutional symptoms of any severity. A very slight febrile reaction, some languor, loss of appetite, and thirst, are the only ones worthy of note.

Herpes Labialis.—This is the most frequent of all the varieties of the disease. It is, as its name implies, a disease of the lips. Usually it is seated upon the line of junction of the mucous membrane with the integument; but it may affect either the former or latter alone. Though generally confined strictly to the lips, the eruption, in some instances, extends to the cheeks, chin, or alæ of the nose.

The disease begins generally with redness, heat, smarting, and painful tension of the portion of the lip upon which the eruption is about to appear. After a few hours, or a day, vesicles begin to show themselves upon the inflamed spot, and there is then observed a red, swollen, and shining point, upon which is seated a group of vesicles. The tumefaction and redness commonly extend some distance beyond the vesicles. The latter develop themselves rapidly, until five or six small, rounded vesicles, filled with a transparent fluid, are seen. The vesicles remain solitary, or several may unite together to form one of considerable size. After the complete development of the eruption, the burning pain which existed at first commonly subsides. The contents of the vesicles soon become turbid and lactescent, and are converted, by the third or fourth day, from a serous into a sero-purulent fluid, at which time, also, the accompanying redness and swelling have, in great measure, disappeared. Soon after this, brownish crusts are formed by the drying up of the fluid of the vesicles, and these drop off usually about the seventh or eighth day. A slight redness remains for a short time at the point of eruption, and then disappears entirely.

Herpes Zoster.—This variety of herpes is known also by the names of Zona and Shingles. It is of much less frequent occurrence, in this city, in children, than either the herpes labialis or circinatus. We have never as yet seen a case of it in a child, though Rilliet and Barthez state that they met with this form and the herpes labialis more frequently than any other. The peculiarity of the disease consists in the

HERPES CIRCINATUS.—This variety of herpes has been called also ring herpes, herpetic ringworm, and vesicular ringworm; it will be found described under the name *tinea circinata* in the article on parasitic diseases of the skin.

HERPES IRIS.—This is a very rare variety of herpes, and one that we have never yet met with in children. It begins with small red spots, which are soon surrounded by four or five rings of different shades of redness. About the second day of the eruption, the central red spots present in their centres one or more vesicles, and on the third and fourth days, vesicles of very minute size generally appear on the outer concentric rings. After two or three days, the fluid contained in the central group of vesicles, which was transparent at first, becomes turbid, and about the fifth or sixth of the eruption, it is absorbed, and the disease terminates by a slight desquamation. The vesicles formed on the outer ring undergo the same changes as those described as occurring on the central ones. In some instances, the vesicles open, and their contents escaping, form small, thin, and brownish scales, which fall off in ten or twelve days.

Herpes iris may attack any part of the body, but is most frequently developed upon the face, hands, fingers, and neck.

According to some dermatologists, as McCall Anderson, herpes iris is a parasitic disease and merely a form of tinea versicolor.

DIAGNOSIS.—The diagnosis of herpes is seldom attended with any difficulty. The small size of the vesicles, their globular shape, their number, their aggregation upon distinct patches of inflamed integument, and the slight degree of constitutional disturbance attendant upon the disease, all render the eruption unlike any other cutaneous affection, and therefore easy of recognition.

Herpes phlyctenodes might possibly be confounded by an incompetent observer with pemphigus. The recollection that the eruption in pemphigus consists of distinct bullæ, much larger, of course, than the vesicles of herpes, while that of herpes phlyctenodes consists of numerous vesicles, much smaller than the bullæ of pemphigus, and closely dotted over isolated red patches, will always serve to distinguish the two affections. It might be mistaken also for eczema, when the vesicles of the latter are disposed, as sometimes, though rarely, happens, in groups. The distinction may be made however, by attention to the facts that the eczematous vesicles are redder, less elevated, scarcely transparent, and that, though arranged in groups, they are confluent, whilst in herpes they are always distinct.

Herpes labialis is not likely to be mistaken for any other eruption. Herpes zoster may always be distinguished by the peculiar belted form assumed by the eruption.

There is but one disease with which herpes iris is likely to be confounded—roseola annulata. The entire absence of vesicles in the latter affection will always, however, enable us to make the distinction.

PROGNOSIS.—The *prognosis* of herpes is always favorable. It is never in itself a dangerous disease, though the variety called zona often

ARTICLE III.

SCABIES.

Definition; Synonyms; Frequency.—Scabies is a contagious eruption of the skin, characterized by the formation of papules, vesicles, or pustules; the vesicles being pointed, generally discrete, and usually presenting small red lines, of one or several lines in length, running off from them. The eruption is attended with severe itching, and is caused partly by the presence in the skin of a small insect, called the *acarus scabiei*, and partly by the scratching which the intolerable itching provokes.

Causes.—Itch is a contagious malady, and is in all probability caused only by contact, either immediately with some person laboring under the disease, or with articles of clothing worn by an infected individual.

It is much more frequently met with amongst the poor and destitute, whose habits are uncleanly, who live closely packed together in small and inconvenient houses, and in whom, therefore, the means of communication are more abundant, than amongst the easy classes of society, whose habits, and, consequently, liability to contact, are the opposite of those just named.

The disease usually appears in children in from four to five days after the exposure to contagion. In healthy, sanguine children, it often shows itself within a shorter time—after two days—while in those who are feeble and weakly, the period of incubation may be even longer than four or five days.

Symptoms.—The first symptoms of itch appear in the part to which the cause, a contagious contact, may have been applied. In infants at the breast, it is usually first developed on the hips and thighs, as it is those parts that are most constantly in contact with the nurses who carry the child, and from whom young children generally receive the infection. In older children, the disease commonly appears first on the wrists and between the fingers, and extends thence more or less quickly to the flexures of the elbows, and to the axillæ and abdomen. It rarely or never attacks the face in adults; but in children, even this part is not, according to M. Richard, exempt. (*Trait. Prat. des Mal. des Enfants*, p. 590.)

The disease is always attended with severe itching, which, in infants, causes uneasiness and fretfulness, and, in older children, violent scratching. The itching is increased by the heat of the bed-coverings, and is, therefore, most troublesome at night. The eruption appears in the form of more or less numerous vesicles, which are small, discrete, acuminated, and transparent at the top. The vesicles are at first of a faint rose color, and they contain a viscid, transparent serum. Their number is variable, being sometimes very abundant, and at others sparse. They either open spontaneously, or are soon broken by the fingers or clothes, large proportion of cases.

When a recent vesicle is carefully examined, there
observed running off from it, in a straight, curved, or
whitish or reddish line, like that produced by the scrat
line marks the course of the fecundated female of the a
burrowings under the epidermis, and is called the cun
It varies in length from one or two, to five or six lin
where it terminates opposite to the vesicle, there is
a small rounded projection, deeper in color than the
culus, beneath which lies the insect. The acarus can
this spot, and removed, by carefully introducing hori
epidermis the point of a small needle, and by manipula
off a small layer of the epidermis. The insect clin
the needle, and can then be extracted from its lodger

The number and extent of the vesicles vary greatl
jects. In some they are confined to limited surfaces
and particularly in robust, sanguine children, and in t
lected and imperfectly cleansed, they extend to many
over the greater part of the body.

Itch occasions in children much irritability and su
neglected may injure seriously the general health, and
and debility.

The acarus scabiei is an arachnoid insect, varying
Wilson's measurements, between $\frac{1}{147}$ and $\frac{1}{77}$ of an in
between $\frac{1}{303}$ and $\frac{1}{93}$ of an inch in breadth. It is of a
ing color, when examined with the naked eye, of a g
is provided with eight legs, four anterior and four p
accurate and minute account of the structure of the
Mr. Wilson in his work on diseases of the skin (7th
Besides the female, which is found, as before stated,

or its ova can be extracted from the skin, there will remain, of course, no doubt; and if the cuniculi be distinct and numerous, the diagnosis becomes almost as certain as when the insect itself is obtained. Before endeavoring to detect the cuniculi, it is always advisable to make the patient wash the part thoroughly.

In doubtful cases, it has been recommended by Gull and Hilton Fagge o search for the ova in the crusts or the thickened and undermined cuticle in the neighborhood of the vesicles. In order to detect these, a small piece of the crust should be boiled in a solution of caustic soda, ʒss. to f℥j of water, until it is in great part dissolved; the fluid should then be allowed to settle, the supernatant part decanted and the deposit examined, which will, in cases of true scabies, be generally found to contain larvæ, ova, or egg-shells.

When, on the contrary, the insect cannot be found, and when the cuniculi are absent or not distinct, the diagnosis becomes more uncertain. The diseases with which it is most likely to be confounded are eczema simplex, prurigo, and lichen simplex. From the former it may usually be distinguished with certainty by attention to the following points. In eczema the vesicles are flattened, or globular, scarcely raised above the surface, and they are collected together in clusters; in itch they are acuminated, elevated, and either entirely distinct, or much ess confluent than in eczema; in eczema there is a sensation rather of pricking than itching, whilst in itch the sense of itching is severe and distressing; and lastly, itch is communicable by contact, whilst eczema s never contagious.

Prurigo begins with papules, which always remain such. The scabs in prurigo are small and black, consisting of coagulated blood, caused to exude by the rubbing off of the top of the papule; while in scabies the scabs are more like thin, yellowish, and friable scales. The seat of the two eruptions is different. Prurigo is developed upon the back, the shoulders, and upon the extensor surfaces of the limbs; while itch appears first about the thighs and buttocks, between the fingers, or about the flexures of the joints. Lastly, prurigo is never, itch always, contagious.

Lichen simplex is a papular disease, in which the papules are closely agglomerated, while in scabies the papules, if present, are conjoined with vesicles, and are discrete. Lichen sometimes affects the hands, and might then be mistaken for itch; but in the former the eruption affects the dorsal surface of the hands, while in the latter it appears in the interspaces of the fingers. Lichen is never attended, as itch always is, by severe pruritus. Attention to these points of difference will almost always render the diagnosis of the two diseases very easy and certain.

When, as sometimes happens, scabies is intermingled with other eruptions of the pustular, papular, or vesicular kind, the diagnosis can be arrived at with certainty, only by careful attention to the cuniculi, or by the detection of the insect. When neither of these characteristic have been recommended. Mr. Wilson states that he found camphor dissolved in oil, in the proportion of one drachm to the ounce, answer every purpose of eradicating the disease; and Dr. Coley (*Prac. Treat. on Dis. of Children*, Phil. ed., 101) speaks highly of an ointment composed of a drachm of iodide of potassium to an ounce and a half of lard, of which a little is to be applied all over the body, except the head and face, every night.

Ointments containing carbolic acid or petroleum are also used with good effect.

The use of stavesacre and hellebore has lately been revived, and apparently with good success; and Anderson highly recommends an ointment made by melting together one part of liquid styrax with two of lard.

The disease rarely requires any constitutional treatment. If, however, any complication exist, or the general health be deranged in any way, such measures as may be necessary for the removal of either of these conditions should be employed, in connection with those proper for the specific disease.

CHAPTER III.

BULLÆ.

ARTICLE I.

PEMPHIGUS OR POMPHOLYX.

Definition; Synonyms; Varieties; Frequency.—Pemphigus is an eruptive disease, characterized by the presence on one or several parts of the body of more or less numerous bullæ of considerable size, nearly always isolated, resting upon circular or oval erythematous patches, about as large or somewhat larger than the bases of the bullæ themselves. The bullæ form in the course of a few hours, and contain at first a limpid serum, which soon becomes reddish or turbid; they terminate by desiccation and the formation of thin crusts, or by rupture and the escape of their contents, when there remains behind a superficial ulceration.

Authors formerly described numerous varieties of this disease, and gave to some of them the title of pompholyx. Of late years, however, these have been reduced to a few forms, and we shall confine our remarks to those most apt to occur in children. The only variety which is really important in children is the pemphigus acutus. The pemphigus chronicus, a dangerous and not unfrequent variety in old people, is so rarely met with in early life, as to make it unnecessary for us to while in cases in which they appear at successive periods, lasting three or even four weeks.

Diagnosis.—The diagnosis of pemphigus acutus is seldom difficult. The large isolated bullæ, seated on inflamed patches of the integument, filled with transparent serum, and followed by thin lamellated scabs, are unlike any other kind of eruption. From rupia, the other form of bullar disease, it is to be distinguished by the smaller number of blebs in the former, by their greater flatness, and by the facts that these are followed by true ulcerations, and by thick and prominent scabs.

Prognosis.—Acute pemphigus is rarely dangerous when it exists without complications. When, however, it is very extensive, and accompanied with severe constitutional symptoms, and particularly when it exists in connection with other diseases, or occurs in a child whose health has been broken down by unwholesome hygienic influences, it may assume a dangerous character, and the prognosis should, therefore, always be guarded under such circumstances.

Treatment.—Simple acute pemphigus requires, as a general rule, no other treatment than attention to diet, and regulation of the digestive function. When constipation is present, this should be overcome by means of simple enemata, or by the use of some mild laxative, as manna, spiced syrup of rhubarb, or very small doses of castor oil. If the discharges be too frequent, they should be restrained by the use of opium in doses proportioned to the age of the child. In young infants, it will often be found that the gastro-intestinal secretions are of an acid and irritating character. This condition may be treated with small doses of paregoric or laudanum, combined with lime or magnesia-water, or with soda. The diet must be managed according to the state of health of the child. For an infant, a good breast of milk is, of course, the best treatment in the world. For older children, the diet ought to be light and unirritating, but, at the same time, nourishing and strengthening.

The local treatment should consist, in the early stage, of an occasional warm bath. When the bullæ have fully formed, they ought to be punctured, and the fluid gently pressed out, care being taken not to remove the cuticle, as this forms the best possible dressing for the inflamed integument. When the bullæ are followed by excoriations, these may be dressed with an ointment consisting of equal parts of Goulard's cerate and simple cerate, made a little soft by the addition of glycerin, or with carrot or elder-flower ointment, or with Turner's cerate.

When the child shows signs of debility during the progress of the disease, and also when the eruption tends to assume a chronic course, the treatment ought to be tonic and invigorating. It should consist in the use of a nutritious diet, and in the exhibition of tonics, as Huxham's tincture of bark, in small doses, quinia, arsenic, cod-liver oil, or in the use of wine-whey, or small quantities of brandy.

with much tenacity, and remain attached for a variable, and, as a general rule, considerable length of time. When at length they fall off, or are removed, there are left beneath ulcers of variable depth and extent, which are either covered by fresh crusts, or, as more frequently happens, remain open, presenting a foul surface of a livid red color, with thickened edges. The ulcers are difficult to heal, and, after cicatrization, leave livid or purplish stains, which often remain for months. The number of bullæ is usually small, there being generally one at its height, and one or two about to appear, or on the decline.

Rupia Escharotica.—This variety of rupia, formerly described as belonging to the class pemphigus, and then called pemphigus infantilis and gangrenosus, differs in some respects from the other varieties of rupia, and particularly in the absence of the thick and projecting crusts, which characterize rupia simplex and prominens. It occurs chiefly amongst cachectic children, appearing usually in the period between birth and the first dentition. It is seated generally upon the neck, chest, abdomen, scrotum, or inferior extremities.

The eruption begins in the form of purplish or livid spots, raised slightly above the level of the skin. Upon these spots the cuticle is soon elevated by a serous fluid, so as to form small bullæ, which become rapidly larger, until they attain their full size. The bullæ are smaller than in the other varieties of rupia; they are irregular in shape, flattened on the top, and are surrounded by purplish areolæ in the early stage of the eruption; the fluid they contain becomes, at an early period, turbid and dark-colored, or almost black. The bullæ soon wrinkle, burst, and leave ulcerated surfaces, which are painful, often covered with sloughs, secreting a sanious and fetid pus, and difficult of cure.

Soon after the formation of the ulcers, a fresh crop of bullæ, forming a new eruption, often appears and passes through the same phases as the first, thus prolonging and extending the disease. This form of rupia is attended with much pain, with fever, sleeplessness, restlessness, and often ends fatally from the severe and continued irritation kept up by the disease. In cases ending favorably, the process of cicatrization is always slow and difficult.

Diagnosis.—Rupia is likely to be confounded only with pemphigus and ecthyma. Pemphigus is to be distinguished from rupia by the larger size and greater distension and prominence of its bullæ; by the fact that the contained fluid of the latter is serous and transparent in pemphigus, instead of being turbid and sanguinolent, as in rupia; by the different character of the crusts, which, in pemphigus, are thin and lamellated, while in rupia they are thick and rugous; and, lastly, by the deep and unhealthy-looking ulcerations that follow rupia.

Ecthyma is unlike rupia in being a pustular disease from the first. Moreover, the pustules of ecthyma are surrounded by a highly inflamed areola, which is not the case in rupia, while the crusts in the former disease differ from those in the latter, in being smaller, harder, more irregular, and more adherent.

CHAPTER IV.

PUSTULES.

ARTICLE I.

ECTHYMA.

EFINITION; SYNONYMS; VARIETIES.—Ecthyma is an eruption char-
erized by prominent, rounded, and usually discrete pustules of con-
erable size, with hard and inflamed bases. The pustules are followed
thick, brownish crusts, which leave on their fall a reddish mark, or
re rarely a superficial ulcer or a true cicatrix.

cthyma has been called also phlyzacia. There are two varieties of
disease to which children are subject, *ecthyma vulgare* or *acutum*,
ecthyma infantile.

AUSES.—The most frequent causes of ecthyma are the application
rritating substances to the skin, such as croton oil and tartar emetic
tment, and the presence of other eruptions upon the skin, particu-
ly small-pox, measles, scarlet fever, herpes, or scabies. The causes
t named give rise to the variety called ecthyma vulgare, which, it
y be well to state in this place, is of an acute character, and has
refore been called by some writers ecthyma acutum. The other
iety of the disease, ecthyma infantile, is a chronic affection, and
urs almost always in feeble, badly nourished, and cachectic chil-
n, and in those whose health has been injured and broken down by
austing diseases, and particularly by disorders of the gastro-intesti-
apparatus.

YMPTOMS.—*Ecthyma vulgare* occurs most frequently on the extremi-
s and neck, and more rarely on the trunk of the body. It appears
the form of small, red, and circumscribed spots, projecting above the
face of the skin, hard to the touch, and accompanied by smarting
often severe pain, and by soreness on pressure. The centre of the
ts is soon elevated into a pustule, filled with a purulent fluid. The
of the pustules varies, but is usually about that of half a pea.
h pustule is generally surrounded by a hard base of a bright red
r, constituting an areola, while, in some instances, the whole of
red elevation is covered by the pustular formation. The pustule
ains unchanged usually for three or four days, and more rarely for
ek, and is then converted, by the drying up of the effused fluid, into
innish brown scab, which drops off after a few days, and leaves a
ested purple spot that remains for some time longer. In other in-
ces, the pustule breaks and leaves a small ulceration which termi-
s with a slight cicatrix. The eruption is commonly successive; and
ldom accompanied by any febrile reaction.

fluid which they contain is generally not very thic
and sanguinolent appearance; they terminate by
dark and adherent crust, by absorption of the co
kind of desquamation, or by a bloody excoriation,
which are followed by a deep stain upon the skin o

Diagnosis.—Ecthyma is more likely to be conf
than with any other disease. The pustular charact
the very beginning, will, however, almost always e
guish it from the broad and distended bullæ of ru
purulent fluid; and the difference between the two
marked, when we recollect the hard and inflamed
pustules of ecthyma rest, and the shapeless crusts a
riations of that disease, instead of the projecting, r
ted scabs, and deep ulcerations of rupia. Ecthyma
to be mistaken for the small and numerous pustules
umbilicated ones of small-pox.

Prognosis.—Ecthyma is never a dangerous disea
danger accompany it, it arises rather from the enfee
state of the general health under the influence of w
than from any injury caused by the eruption. The
pend, therefore, upon the state of the general hea
the attack of the disease.

Treatment.—In both varieties of ecthyma, atte
health of the patient constitutes the most importan
ment. In the acute form, mild laxatives, small do
tive, as the hydrargyrum cum cretâ or sulphur, the
and wholesome, and especially of an unstimulating
application of mucilaginous infusions, or of a mil
ment, as Goulard's cerate, Turner's cerate, or the c
elder-flower ointments, with occasional warm bathi

well-ventilated apartment; the clothing must be regulated according to the age of the child, and the season of the year; and, what is most important of all, the diet ought to be such as is digestible, suitable to the age, and, at the same time, nourishing and strengthening. The internal remedies must consist of tonics in all cases, and when the digestive power and general strength are reduced much below the normal standard, of stimulants. The best stimulant is old and pure brandy, either given mixed with water, three or four times a day, or combined with the food. The best tonics are, in most cases, some preparation of iron, and the one we prefer is the iodide, given mixed with syrup of ginger, or, when the bowels are not too irritable, with small quantities of the compound syrup of sarsaparilla, or cod-liver oil. When, for any reason, iron is not given, quinia, or extract of cinchona, may be substituted. While these remedies are being employed, or prior to their administration, the gastro-intestinal functions ought to be carefully regulated by the use of mild laxatives when the bowels are constipated, or by some kind of astringent when they are loose and disordered.

The external or local treatment must consist in the use of mild demulcent applications, or of soothing or cooling ointments, during the pustular stage of the eruption. When unhealthy excoriations or ulcerations follow the pustules, these may be brought into good condition by the employment of weak solutions of nitrate of silver or sulphate of zinc, or of a very weak lotion of nitric or muriatic acid.

CHAPTER V.

PAPULES.

ARTICLE I.

STROPHULUS.

This is a form of papular eruption which some writers regard as a variety of lichen, giving to it the name of *lichen strophulus.* It, however, differs somewhat in its characters from the lichen of the adult, and, as it is peculiar to children, deserves a separate consideration.

Strophulus is a disease affecting chiefly infants at the breast, characterized by a more or less extensive, and sometimes a general eruption of papules, which are whiter or redder than the surrounding skin, and are accompanied by more or less irritation and itching.

Its causes are various disturbances of the digestive apparatus in very young infants, and in older ones the effort of the first dentition.

Varieties and Symptoms.—The *strophulus intertinctus,* or *red gum,* Symptoms.—The papules of prurigo are small, but slightly prominent, and attended with moderate itching, constituting the *prurigo mitis;* or they are larger, more projecting, and attended with the most violent pruritus, forming the *prurigo formicans.* The papules are usually of the color of the skin, except when they have been torn by the nails, and are generally seated upon the outer surfaces of the limbs, and the upper part of the trunk.

When the itching is severe, the tearing of the papules by the nails causes the escape of a small drop of blood from the tops of many of them. The blood dries and forms so many small black crusts crowning the summits of the papules, a peculiarity which constitutes one of the most distinctive features of the disease. The papules terminate by absorption or by a slight desquamation.

The *duration* of the eruption is very uncertain. In acute cases, when properly treated, it may end in a few weeks, though it often, and indeed more generally, lasts for several months.

Diagnosis.—The only diseases with which prurigo is likely to be confounded are strophulus or lichen. It may be distinguished, however, generally with ease, by the facts that the papules of prurigo are larger, less numerous, and more extended, than those of strophulus or lichen; that in the latter diseases the papules are never crowned by the small black crusts of prurigo, and they are never attended with the same violent itching as the former.

Prognosis.—Prurigo is never perhaps a dangerous disease, though usually a very troublesome one from the severe irritation which attends it, from its not unfrequently obstinate resistance to treatment, and its disposition to relapse.

Treatment.—The internal treatment of prurigo in children should consist in the use of sulphur, given alone or in combination with magnesia, of demulcent drinks, of mild laxatives when there is constipation, and of such remedies as may be rendered necessary by any disordered state of the digestive function. The diet must be carefully regulated. It ought to be nourishing and sustaining, but at the same time light and easy of digestion.

In addition to the internal treatment, simple warm-water baths, or emollient baths of flaxseed, bran, slippery-elm, or marsh-mallow, should be made use of in the early stage of the disorder. At a later period, alkaline baths, containing from three to eight ounces of carbonate of potash to each bath, according to the age, are recommended by Cazenave and Schedel. To allay the cutaneous irritation, mild ointments are often found useful. Billard employed with success, in a child six months old, inunctions with the oil of sweet almonds. Soaps or lotions, containing juniper tar or carbolic acid, are excellent anti-pruriginous applications; and relief will frequently be obtained from the application of a dilute solution of chlorinated soda. When the case is obstinate, resisting emollient and alkaline baths, sulphurous baths must be made use of.

In cases where the eruption persists despite the use of local applications and attention to the digestive functions, the child should be placed upon the use of the ferro-arsenical mixture.

PITYRIASIS is a slight scaly disease, which may attack the head only, or extend to other parts of the body. In children, however, it is generally confined to the scalp, and may be recognized by the existence on the part of innumerable small, thin, whitish, furfuraceous scales, which form a thin or thicker covering for the scalp, in proportion to the amount of care bestowed on the cleansing of the head. The scales of epidermis are easily rubbed off, and the surface beneath is rarely found to present even the slightest inflammation.

It is a disorder of minor importance, and seldom requires other treatment than some mild lotion or ointment, and strict cleanliness. When, however, it persists, the child should be placed upon the use of the ferro-arsenical mixture internally, and applications of dilute citrine ointment should be made to the patches of eruption.

ICHTHYOSIS is an eruptive disease in which there appears on various parts, and usually over the larger portion, of the skin, epidermic patches or squamæ, that are hard and dry, and of more or less considerable size. The patches are generally of a dirty gray or earthy color; they exfoliate, and leave the skin beneath a little thickened and roughened, but never inflamed. The disease is unattended with either heat, pain, or itching. It is ordinarily congenital, lasts many years, and, according to MM. Cazenave and Schedel, is incurable.

Billard recommends, however, in the ichthyosis of new-born children, the use of warm and emollient baths, frictions, with oil of sweet almonds or olive-oil, acidulated drinks, and perfect cleanliness.

CHAPTER VII.

DISEASES OF THE SKIN NOT CLASSIFIED AMONGST THE PRECEDING.

SECTION I.

PARASITIC SKIN DISEASES.

GENERAL REMARKS.—The diseases now regarded by many authorities as due to the presence of a vegetable parasite upon the skin are as follows:

1.	Tinea Favosa or Favus		Parasite: Achorion Schœnleinii.
2.	Tinea Tricophytina,	Tinea Tonsurans (Ringworm of scalp), Tinea Circinata (Ringworm of body), Tinea Sycosis (Ringworm of beard),	Parasite: Tricophyton.
3.	Tinea Versicolor (Chloasma, Wilson), ...		Parasite: Microsporon Furfur.
4.	Tinea Decalvans (Alopecia Areata), ...		" Microsporon Audouini.

arly stages of the disease, before any considerable inflammatory hange has occurred, and that in proportion as suppuration ensues they iminish in abundance. And, secondly, that, as already stated, they re capable of transmission to perfectly healthy persons by inoculation.

There can, however, be no doubt that the development of the fungus, nder ordinary circumstances, is greatly favored by the constitutional ondition of the patient and the state of the cutaneous surface. Thus t is especially in children of a delicate or strumous constitution, that hese various diseases are most frequently met with; and when, in ddition, personal filthiness with inattention to properly combing and leansing the hair, and changing the clothing, are combined, the spores nd the most favorable conditions possible for their rapid development.

There remains the further question, upon which authorities are still ivided, whether there are various fungi concerned in the production f these diseases, or whether the apparently different species are merely ifferent stages of a single fungus. For the sake of greater ease of eference and comparison, we will here give a brief description of their haracteristic appearances.

Fungus of Favus.—In the earliest stage of development of the favus rust, it is still covered by the superficial layer of epidermis; but later, hen this is ruptured, it still presents an envelope of a sulphur-yellow olor, which on microscopic examination shows a homogeneous or finely ranular substance. The interior, of a pale white color, is the true avus matter, and consists of the sporules, thalli, and mycelia of a ungus named the achorion Schœnleinii, in honor of Schœnlein, who irst fully described it.

The sporules are of a rounded, or more frequently of an oval form, nd have well-marked edges, and a homogeneous and slightly opalesent interior. Their average diameter is about $\frac{1}{3000}$th of an inch. Many of these sporules are seen to be grouped together, while some re more elongated and present a contraction in the middle; others are early triangular in form, with rounded angles; others, yet more elonated, are marked with several contortions. Some sporules, completely ormed, seem to have a double envelopment membrane, and others resent in their interiors something like a nucleus.

There are also present numerous diaphragmated tubes, formed by he development and confluence of the sporules, which are either simple r present ramifying branches. These tubes vary in diameter from $\frac{1}{1000}$th to $\frac{1}{15000}$th of an inch, and are either empty or have granular ontents. Amongst the sporules and mycelia, especially towards the ircumference of the cups, may be seen a considerable number of moleclar granules, which are probably imperfectly developed sporules.

The next parasite, the *tricophyton*, is that which, according to McCall Anderson, and some other dermatologists, produces tinea tonsurans, inea circinata, and tinea sycosis.

The microscopic characteristics of this parasite, as first described by Malmsten, in 1845, and since confirmed by numerous observers, are very umerous rounded or oval sporules, about $\frac{1}{7000}$th of an inch in diameter, diseases we have mentioned, as Dr. Anderson, does not

Numerous observations have been made which go to
ence of a very wide range of variation as regards forn
and have led some observers to assert not only the i
particular forms, but indeed to refer all varieties of ep
some one central type.

The evidence upon which this view rests, mainly
results obtained from germination of the various fun
study of their transitional forms, cannot at present be
clusive; and further investigation of the question is de

It is, however, thought by some high authorities, th
be entertained in regard to the identity at least of the
produce the various forms of tinea, including the achor
microsporon furfur of tinea versicolor, and the tricoph
ous varieties of ringworm. The most complete exposi
ments upon which this view is based, will be found
Fox's admirable treatise on skin diseases of parasitic
1863).

On the other hand, some eminent dermatologists
fungi which produce these diseases, are essentially dist
ments upon which they base this opinion may be brie
follows, in the language of Dr. Anderson (*loc. cit.*, p. 1

That in all cases of successful inoculation with the
phyton, and microsporon furfur, the same parasitic
produced as that from which the parasite was taken.
numerable cases occurring in the human subject, illustr
tagious nature of favus, tinea tonsurans, and tinea ve
no authentic case in which one of these diseases gave
others.

That the difference in the appearance of the erup tagion or inoculation, favus has always given rise to favus, and tinea tricophytina to tinea tricophytina.

We regard then the parasitic nature of these affections as undoubted, but more extended observation is necessary before the relations of their respective fungi can be determined.

ARTICLE I.

FAVUS.

Favus is a parasitic disease of the scalp, long confounded by different writers with other and very dissimilar affections of that part. In consequence of this confusion it has received a great variety of names, of which the most generally known are porrigo and tinea. In adopting the above title, we follow the example of Erasmus Wilson and other recent authorities, amongst the English, and of MM. Rilliet and Barthez, Gibert and Rayer, amongst the French.

Definition; Synonyms; Varieties; Frequency.—Favus is a specific contagious eruption of the scalp, characterized by inflammation of the hair-follicles dependent upon the presence of a peculiar fungus, the achorion Schœnleinii. It is distinguished at first by small yellow pustules, countersunk in the skin; these are soon converted into yellow cuplike crusts, which adhere often for a very long period. It usually causes permanent loss of hair at the affected part.

The disease is described by most of the former English writers under the title of porrigo, but as several other eruptions have been included under the same name, we think it best to follow the example of Mr. E. Wilson, and call it favus. By MM. Biett and Cazenave it is designated, after Willan, porrigo favosa and porrigo scutulata. MM. Rayer and Gibert, as above mentioned, give it the name of favus.

There are two varieties of favus, the *favus dispersus*, the porrigo favosa of most writers, and the *favus confertus*, the porrigo scutulata of many observers.

The disease is much less frequent than eczema of the scalp, but is nevertheless constantly met with amongst the crowded populations of Europe. In this country it is more rare, and amongst the middle and upper classes, at least of this city, is almost unknown, since we have never met with a case of it in our own private practice, though we have occasionally seen it in the hospitals here.

Causes.—The only well-ascertained exciting cause of favus is generally thought to be *contagion*, a quality of the disease acknowledged by most observers, though denied by Mr. E. Wilson, who considers its cause a debility of nutritive vitality, allied with struma. It may be propagated by direct contact of the diseased with a healthy skin, or by depressions corresponding to the first-formed pustules. In rare cases, the disease is so extensive as to form a kind of mask covering the whole scalp.

When the disease is not interfered with by treatment, the crusts remain adherent for a long time,—for months or even years; they become also paler in color than they were at first, and so dry and pulverulent, as to break very readily when rubbed or touched. They become, moreover, thicker and more massive, and lose their first regular cuplike form, from the disappearance of their depressions, and from the irregular and uneven shape given to their edges and surfaces, by the breaking which they undergo. When the case runs on in this way, the head exhales a most unpleasant odor, which has been compared to that of mice or the urine of a cat; McCall Anderson has, however, noticed a very similar odor in cases of eczema impetiginoides of the scalp. In some instances, where the disease is grossly neglected amongst the very poor, pediculi form in abundance amidst the crusts, and add to the disgusting appearance of the disorder.

When the crusts have been removed by any means, the surface of the scalp is seen to be red, moist, and to present slight erosions or even ulcerations. The crusts are reproduced only by the eruption of new pustules.

An invariable and unfortunate sequel to the favous disease is a more or less extensive loss of the hair. The hairs become loose from a very early period of the disease, and can be pulled out with great ease. As the case goes on they fall out, and the scalp is left smooth, shining, uneven, and deprived of hair. On these spots the hair seldom grows again, and if it does, it comes out thin, woolly, and with every appearance of weakness and unhealthfulness.

Though the usual and favorite seat of favus is the scalp, it is met with occasionally on the forehead, temples, chin, and eyebrows, and, in still rarer instances, on the shoulders, elbows, forearms, on the upper and outer parts of the legs and thighs, on the scrotum, and even on the nails. Even in such cases, however, it has generally existed first on the scalp, and extended thence to the other parts, though it may sometimes begin upon the trunk or limbs in consequence of a direct application to them of the contagious element.

FAVUS CONFERTUS, OR PORRIGO SCUTULATA.—In this variety of favus the pustules are arranged so as to form circles or rings upon the forehead or scalp, instead of being dispersed irregularly over the scalp, as in the preceding variety. The disease begins with red, circular patches, attended with a good deal of itching, upon which, after a short time, appear small yellow pustules, that seem to be sunken in the skin. The pustules are more numerous on the circumference than at the centre of the red patch or disk; or the latter increases in size by the extension of the disease to the follicles just beyond its outer edge. The pustules are exactly like those of favus dispersus, except that their yellow color is of a lighter tint. They desiccate very rapidly, and form crusts which are very thin at first, never very thick, and of an irregular shape.

nguished by an examination of the primary characters of the two isorders. This primary character can always be found by searching t the outer edges of the diseased surface. In favus the pustule is mall, depressed, and contains very little fluid, while in impetigo it is rge, globular, and projecting. The crusts are very different: in the rmer dry, as though dusted with sulphur, cup-shaped, depressed, and sually traversed by a hair; in the latter, rugous, irregular in shape, ot cupped, resting above the skin, and generally somewhat moist and oft. The microscopic examination of the hair or crusts in favus also hows the presence of the achorion Schœnleinii, which is never met with n impetigo. Lastly, the alopecia which so constantly results from avus, does not occur in impetigo.

PROGNOSIS.—Favus is a serious disease because of its usually long duation, the difficulty often experienced in effecting its cure, and because f the loss of hair which it occasions.

TREATMENT.—The treatment of favus should be both general and ocal, for though some writers, and particularly Cazenave and Schedel, tate that it must be altogether external, and that in spite of numerus trials they do not feel authorized to propose any internal means *Malad. de la Peau*, 4ème ed., p. 326); others, as Wilson, Bennett, and Neligan, recommend constitutional remedies as of very great imporance in assisting the cure.

The *general* treatment must be such as may seem called for by the tate of health of the individual patient. When, as so often happens, he disease occurs in a scrofulous person, cod-liver oil, iodide of potasium, nourishing food, air, and exercise, are of the utmost importance. When the health of the patient is feeble and broken from the want of wholesome and abundant food, from insufficient clothing, or from residence in a vitiated, close, and confined air, the removal of these conditions, which undoubtedly act as predisposing causes in the production f the disease, cannot but aid in its cure. Dr. Neligan (*Dublin Quart. Journ. of Med. Sci.*, vol. vi, p. 56) recommends very highly the use of he iodide of arsenic as a constitutional remedy. He states that it may e given with the greatest safety to the youngest child, "its effects eing, of course, duly watched." The dose for a child six years old is ne-fifteenth of a grain, and, for a younger one, from one-eighteenth to ne-twentieth of a grain, three times a day. Dr. Neligan speaks, howver (*loc. cit.*, p. 62), of substituting the yellow iodide of mercury for he iodide of arsenic in the case of a child three years and a half old, eing afraid to give the latter to so young a child. He nevertheless ave this remedy afterwards in the case referred to, but in the dose nly of the twenty-fourth of a grain every morning. It is given to hildren in the state of powder mixed with sugar or aromatic powder, nd produces, when the system is saturated with it, some constitutional ymptoms, as acute headache, dryness of the throat, &c. He has given t, however, in some cases, in full doses for several weeks without any manifestation of its effects, further than those produced upon the dis-

and patient, but by practice a degree of skill is acquired which enables the physician or trained nurse to remove the hair rapidly and with very little discomfort to the patient.

So soon as a clean surface has been thus obtained, some application intended to destroy the vitality of the vegetable growth ought to be made use of. One of the best for this purpose is a solution of corrosive sublimate, the strength of which, according to Lebert, ought to be, when employed in lotion, from two to four grains to the ounce, and, when used as a fomentation, weaker. This is also McCall Anderson's favorite application. Dr. Bennett (*Ranking's Half-Yearly Abstract*, No. xii, 1850, Am. ed., p. 73), employs, to fulfil this indication, cod-liver oil. The head is kept constantly smeared with the oil, and covered with an oiled silk cap. This application is, however, merely palliative, and, so soon as it is intermitted, the disease reappears.

There are various other remedies that have been applied to the diseased scalp empirically, either to "modify the state of the skin," to "excite the disordered follicles to healthy action," or, lastly, to "destroy the vitality of the fungus, and, by altering the nature of the soil on which it flourished, to prevent its reproduction." Without attempting to define the mode in which any of these various substances may produce their effect, we deem it best to mention as succinctly as possible those which have the strongest testimony in their favor.

Mr. E. Wilson, who it will be remembered does not believe in its parasitic nature, is less favorable to strong applications than he was formerly. Those he now prefers are the ceratum tiglii, containing from ten to thirty drops of the oil to the ounce; the unguentum hydrargyri nitratis, diluted one-half; the unguentum hydrargyri nitrico-oxidi, diluted in similar proportion; the compound sulphur ointment, and some others.

Dr. Bennett's application of cod-liver oil has been referred to above. This, in connection with the constitutional treatment for scrofula, is said to have cured, on an average, in six weeks.

MM. Cazenave and Schedel recommend alkaline and sulphurous applications, and acidulated lotions. They speak very favorably of, and give much the highest place, amongst the substances to be used in friction, to the iodide of sulphur. This remedy was originally made use of by Biett, and employed by him with much success. Its efficacy is attested also by Lebert. It is used in the form of an ointment, consisting of from a scruple to half a drachm of the drug to an ounce of lard, which is to be applied morning and evening to the diseased surfaces by gentle friction.

Applications of hyposulphite of soda, in proportion of ʒj to f℥j of water, or of sulphurous acid lotions, are highly recommended. Among the parasiticides most valued in France, are oil of cade and turpeth mineral, which latter may be employed in the proportion of ʒj to f℥j of glycerin of starch, which is perhaps the best excipient for the various parasiticides.

ready growth of the parasite. In like manner, dirtiness of every kind may be said to be a predisposing cause.

The influence of these is, however, trifling, and we have frequently met with the disease among families living in easy or very affluent circumstances, the children of which were perfectly well lodged, well clothed, and well fed, and to whom every attention required by the nicest cleanliness was given. The means by which the affection is communicated are such as brushes, combs, caps, &c., or by the direct contact of the diseased surfaces.

One of us has but lately had an opportunity of studying, on a large scale, these affections and the mode of their transmission, at a large Children's Home in this city. There were a considerable number of children, about twenty in all, affected with the disease in a severe form; by strict isolation, by the utmost care in preventing any use of their combs, brushes, caps, or clothing, by the other children, by covering the entire scalp with an oiled-silk cap, whenever they mingled with their comrades, the disease was prevented from spreading. It was, however, frequently observed, that in the children who suffered with tinea tonsurans of the scalp, patches of tinea circinata would appear either on the neck or face, or on some part which could be brought in contact with the affected surface; and its highly contagious nature was unhesitatingly believed by all the attendants, who had indeed themselves furnished the strongest evidence possible of it, by each and all contracting the disease repeatedly from handling the children in dressing them, or in making applications to the affected parts.

Age exercises a marked influence upon the production of these diseases, tinea tonsurans being confined to childhood and early youth, most commonly occurring between the ages of three and twelve years; though tinea circinata may be met with at any age.

TINEA TONSURANS.—SYMPTOMS.—Those who regard this disease as a variety of herpes, describe its first appearance as a ring of minute vesicles; this, however, is not essential, and the disease most frequently begins with little erythematous patches, which increase circumferentially while they heal in the centre, leaving the skin more or less furfuraceous. When fully established, the disease appears in the form of furfuraceous patches of oval or circular shape, which are at first not more than ⅛th or ¼th of an inch in size, but which increase gradually until they attain a diameter of one or two inches, and seldom more. The diseased surface is slightly thickened, elevated, of a grayish, bluish, or slate color, and covered with fine dry scales, which are very easily rubbed off, and are quickly renewed after being removed by any cause.

The hairs are altered from the very first. In the early stage, the apertures of the follicles of the diseased hairs are generally more or less prominent or papillated, and the hairs are unnaturally brittle, dull, and dry, and are bent on themselves and twisted, so as not to lie smooth, and the roots are somewhat matted together by the furfuraceous scales. A little later, they break off at a short distance from the diseased surface, leaving the circular patches partially deprived of hair. The broken

They follow the usual course of development, being at first transparent, then turbid, and finally drying into small thin scales.

The size of the patch varies greatly, being in some instances small, not larger than a shilling, and in others presenting a diameter of two or three inches. When small, the redness covers the whole of the patch, but is much fainter in the centre than at the circumference; when large, the centre regains the natural color of the skin. Usually the ring is exactly circular, but at times it assumes an oval shape.

If any hairs have been growing on the affected spot, they become brittle and changed, as before described. There are usually several such circles present, and in some cases they are formed in great numbers. The only symptoms accompanying the eruption are slight pricking, smarting, and itching in the part.

DIAGNOSIS.—There are but few diseases with which there is any danger of confounding tinea circinata. It is distinguished from erythema circinatum by the greater elevation of the marginal ring, by the presence of the parasite, and by its contagious nature; and the two last peculiarities serve to distinguish it from psoriasis circinata.

According to McCall Anderson, and some other dermatologists, herpes iris is merely a form of this affection.

TREATMENT.—The cases of tinea tonsurans that have come under our charge, have proved in many instances very rebellious to treatment.

Strict attention should always be paid to cleanliness and hygienic rules; and, if the disease be associated with any impairment of the constitution, cod-liver oil, iron, in the form of the syrup of the iodide in syrup of sarsaparilla, arsenic, and bitter tonics, should be administered.

The local treatment is, however, the most essential. Where the disease occurs on a part covered with hair, epilation is advised by some authorities, and it would in all probability facilitate and hasten the cure.

Among the local applications which have proved most useful to us have been sulphuro-alkaline lotions, composed of ʒj of subcarbonate of potash and ʒij of sulphur, to a pint of water, applied by washing with a sponge several times a day; strong solutions of sulphite of soda; and an ointment consisting of ʒj of muriate of ammonia, mixed in an ounce of sulphur ointment, applied first at night by inunction, and after a time on rags.

Alkaline remedies have also been much used by other observers, who recommend washing the scalp every morning with a lotion composed of gr. xxx or xl of carbonate of potassa or borax to a pint of water, and applying in the evening an ointment containing ℈j of tannic acid to ℥j of lard.

Much more stimulating applications are, however, highly recommended, and often prove very serviceable. Thus Mr. Wilson advises a single application of the acetum cantharidis, or the stronger acetic acid; and Devergie recommends a solution of nitrate of silver, ʒj to f℥j of water.

removing the crusts and examining the base, numerous exudation corpuscles, and some spores of tricophyton were found; the epithelium not very granular.

Poulticed to remove the crusts. Ordered iodide of iron and potassium internally.

Dec. 4th. Scalp quite clean from crusts, but remains reddish, with here and there bald patches. Numerous spores of tricophyton found in the hairs and among the epidermic cells.

Solution of sodæ sulphis (℥j to Oss. water), applied morning and evening, and kept on during the whole time by means of folds of linen saturated in the solution, and covered with an oil-silk cap.

Dec. 16th. Much improved. Scalp cleaner, and less red. Some flat, thin, whitish scales over surface. Hairs more free from tricophyton, but numerous spores can still be seen by scraping moist surface beneath the thin crusts.

Treatment continued, with ultimate success.

William L., æt. 5; hereditary tendency to tuberculosis; scrofulous; cervical glands enlarged on both sides; admitted in 1865, and has had tinea ever since, many forms of treatment having been tried, but none with more than temporary success.

November 30th, 1866. The scalp is reddened and wax-like from infiltration, with patches of baldness. In places where the eruption is oldest it is covered with whitish scales; elsewhere, there are scattered or confluent grayish-yellow or yellow crusts. Discharge of pale, thin, fetid pus.

On examining the surface beneath the crusts, numerous pus-cells and spores of tricophyton, often aggregated together, are found. The hairs have lost their normal appearance entirely, are bent, and where they emerge from the scalp, the shaft is swollen, with bulging outline. The shafts are covered with spores of tricophyton, and their longitudinal fibres separated by collections of the fungus. Some of the bulbs remain healthy, others are broken and apparently converted into masses of fungous spores.

Ordered poultices to remove crusts; iodide of iron and potassium internally.

December 4th. Scalp clean, with exception of minute white scales; shows bald glazed patches, with light, short, thin hairs. Ordered same application of sulphite of soda as used in previous case.

December 15th. Immensely improved; the large bald patches still covered with minute shining white scales, but few tricophyta to be seen.

Charles L., æt. 4, admitted in May, 1866; hereditary tendency to tuberculosis; cervical glands slightly enlarged. Tinea soon appeared on the face and scalp, and in early part of November, thin flat grayish-yellow crusts formed over vertex, the rest of the scalp being covered with minute whitish scales.

November 30th, 1866. Ordered poultices to remove crusts; iodide of iron and potassium internally.

treless, and brittle, with a fibrous fracture, and rapidly fall out, leaving bald patches.

These patches vary in size from one-half inch to an inch or even more in diameter, and there may be but a single one present, or they may be numerous, in which case they often coalesce, forming large patches of irregular shape; when the patches are single they usually assume a round or oval form.

The denuded portion of scalp is peculiar in appearance, being very white and polished, and thinner than the surrounding healthy scalp; the sensibility of the affected surface is also frequently impaired.

Diagnosis.—There can be no difficulty in recognizing the fully developed disease, excepting in the comparatively rare cases when it is combined with other skin diseases, as eczema or pityriasis.

Prognosis.—The only danger attendant upon alopecia areata is that of deformity, which is, in some cases, very great, depending of course upon the extent of the disease and the stage at which it is brought under treatment.

If the patches are small, the scalp not materially atrophied, and the orifices of hair-follicles still visible on the bald patches, there is good reason to hope that steady persistence in treatment will effect a cure.

Treatment.—Those who regard this as a parasitic affection, advise the ablation of the hairs immediately surrounding the patch, and the application of some of the stimulating parasiticides recommended in the article on tinea.

The majority of authors, however, content themselves with the application merely of such stimulating lotions and ointments as will increase the nutrition of the affected spots, and favor the renewed growth of hair.

Among the ointments which are most highly recommended are those containing the red iodide, the nitrate, the ammonio-chloride of mercury; some form of sulphur; or tar, iodine, or cantharides.

Hillier recommends, as the treatment he has found most useful, the application at long intervals of acetum cantharidis to the bald patches; painting them every other day with tincture of iodine, washing the head twice a week with soap and cold water, and applying a wash (consisting of one pint of rum, one ounce of tinct. cantharidis, one-half ounce of spirit. ammoniæ aromat., and ten ounces of water) to the parts of the head which are not bald, twice a week.

The effect of this local treatment will be much increased by the internal administration of arsenic and iron.

lungs. Bouchut,[1] on the other hand, regards the changes found in the lungs as the result rather than the cause of the induration of the skin.

Letourneau[2] agrees with West in regarding sclerema as a condition depending primarily on congenital weakness, imperfect expansion of the lungs and defective hæmatosis. According to his view it is a slow asphyxia, the body becoming gradually cooled down and the child remaining in a state of organic torpor until death occurs.

SYMPTOMS.—The disease presents some variety of symptoms according as it occurs in early infancy or in more advanced life.

In infants the induration of the skin appears within two weeks after birth, either with or without a preceding febrile condition for a day or two. It invades successively the feet, hands, limbs, the back, the face, and finally involves the entire surface of the body. At this early age, the skin retains its reddish tint in the affected parts; whilst later in life, the surface assumes a dull, slightly yellowish aspect. The skin becomes hard, is with difficulty pinched up, and instead of thinning, remains thick and waxlike. The parts appear somewhat swollen, though never to any great extent, and pressure with the finger scarcely leaves an impression on their surface. Occasionally the induration is associated with an effusion of serum beneath the skin, and when this exists, the surface is much more readily indented.

It is this occurrence of œdema which has led some observers to consider sclerema as a form of anasarca; it is probable, however, that its presence is merely a result of the obstructed cutaneous circulation, and that it does not, in reality, constitute an essential element of the disease. The skin is also quite frequently jaundiced. The children usually preserve the power of moving the affected parts, and there is no loss of cutaneous sensibility. The temperature of the body, and especially of the indurated portions, rapidly decreases, so that from 100° it may fall to 90°, 80°, and even, in some exceptional cases recorded by Roger, to 73° and 70°.

The little patients appear to suffer much pain during this disease. They utter a sharp, abrupt, isolated, but very frequently repeated cry, quite characteristic of the affection, and occasionally they present nervous symptoms, such as twitching of the hands or more general convulsive movements.

The strength fails rapidly, and they soon become too weak to suck. The pulse is feeble, though not much accelerated, unless some complication has ensued. The appetite fails, and the bowels are constipated, unless there is entero-colitis, which occurs in a few cases. This condition is naturally attended with great emaciation, as we find in Elsaesser's[3] cases, where the average loss of weight was three-fourths of a pound, the extremes being six ounces and two pounds.

The respirations are imperfect, and, after a short time, cough makes its appearance and continues throughout the case, indicating the rence of either pneumonia or collapse of the lungs, which are by f most frequent complications, even if the state of atelectasis be r garded as an efficient cause of sclerema. The disease, however, always so general and severe as above described; occasionally it in limited portions of the body, and without any very alarming toms.

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[1] Diseases of Infancy (Bird's trans.).

[2] Letourneau, Sclerema and Œdema. Paris, 1858 (Canstat. Jahrb., iv, 456).

[3] Sclerema, Arch. Gén. N. S., t. i, 1853, p. 531.

In later life the disease is more frequently thus limited to sma tions of the body; the symptoms follow a more chronic course, a somewhat amenable to treatment. Rilliet and Barthez[1] descr acute and chronic form, and mention the following symptoms as guishing the disease in the adult: the severe epigastric pain ass with violent palpitations, the less acute progress of the case, a more frequent implication of the serous membranes.

In one well-marked case, occurring at the age of thirty-five which one of us had the opportunity of observing during its course, these symptoms were very prominent.

PROGNOSIS.—In infants, when the induration is at all general, t case almost invariably terminates fatally in from two to six days. favorable circumstances, however, and when the induration is li resolution may occur, and the case terminate favorably; thoug quires from fifteen days to a month to effect the cure.

The fatal result is either caused by the gradual exhaustion vital powers, or by the supervention of one of the complications a mentioned, by far the most usual of which are lesions of the lun

In later life, when the disease tends to recovery, a long time r consumed before the induration completely disappears. Rilli Barthez report a case, occurring in a girl aged eleven years, which two years, although it was at no time very general or accompan very severe symptoms.

Of 53 cases reported by Elsaesser, all but 4 proved fatal, eithe the sclerema itself, or from some incidental disease.

DIAGNOSIS.—The absence of any lesion of the internal organs, to with the perfectly characteristic appearances of the induration, an error of diagnosis almost impossible.

ANATOMICAL APPEARANCES.—The induration of the surface p after death, and on incising the part, a turbid fluid, resembling anasarca, often flows out. The subcutaneous tissue is also ind and the fat is found in the form of solid granules. This layer, varies from one-half a line to three lines in thickness, is sometin lowed by a gelatinous one.

The fluid which is contained in the meshes of the tissues h subjected to analysis by several observers, but with conflicting r Chevreul and Breschet reporting that it contained a plastic r spontaneously coagulable on contact with the air, which they w clined to regard as characteristic of the disease; whilst Billard, peating this observation with fluid derived from an ordinary case of anasarca, found it to possess the same property. This subject, therefore, of much importance in regard to the pathology of sclerema, requires to be more fully investigated.

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[1] Op. cit., t. ii, p. 106.

The indurated tissue is traversed by numerous vessels, permeable, and for the most part gorged with dark blood. Bouchut believes that the cutaneous capillaries are in great measure obliterated in the indurated parts, and that the œdema which occasionally coexists with sclerema is due to this obliteration; founding his opinion upon an unsuccessful attempt to inject the skin of a limb affected with sclerema, although the injecting fluid freely entered all the deeper tissues. The observations of Elsaesser, however, render this view doubtful, since in 49 cases, he failed to find this condition.[1]

Apart from these morbid changes in the skin and subcutaneous tissue, there is no lesion characteristic of sclerema. In a large number of cases, however, the lungs present some abnormal condition. According to Bouchut, they are often gorged with blood, and here and there contain patches of lobar pneumonia; conditions which he regards rather as the result than the cause of sclerema.

Elsaesser found lobular pneumonia present in a tenth of his cases; and in a third of them, portions of the lungs were impermeable to air. We have already stated that West, following the researches of Bailly and Legendre on atelectasis, believes that sclerema is one of the results of this persistence of the fœtal condition of the lung, not differing in its essential nature from œdema following pulmonary obstruction. The occurrence of undoubted cases of sclerema in the adult, and the frequent absence of atelectasis in well-marked cases of sclerema in infants, appear, however, to render this view untenable.

The entire venous system and the cavities of the heart are distended with dark fluid blood; but the heart presents no constant condition to which could be attributed the production of the disease. The jaundice which has been mentioned as occasionally existing, is not found to be associated with any abnormal condition of the liver, excepting congestion. Entero-colitis is a rather frequent complication of sclerema, and has been regarded as influencing its development; but this view has long since been abandoned. Elsaesser found intestinal lesions and hyperæmia of the abdominal viscera quite commonly; and, in eight of his cases, peritonitis was present.

TREATMENT.—The preventive treatment of sclerema consists in attention to all the hygienic conditions of the young infant.

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[1] We have only space for a reference to the elaborate paper on keloid, scleriasis, and morphœa, by Dr. Hilton Fagge (*Guy's Hospital Reports*, 3d S., vol. xiii, 1867, p. 255), in which the clinical history of sclerema in the adult is fully detailed; and to the valuable contributions to the pathology of this disease by Rasmussen (*Trans. in Edin. Med. Jour.*, vol. xiii, part i, pp. 200 and 318). According to this latter observer, the essential element in the changes of the skin in sclerema consists in a marked development of lymphoid cells, by multiplication of the cells in the peri-vascular sheaths of the minute bloodvessels of the derm and subcutaneous tissue.

CLASS VIII.

WORMS IN THE ALIMENTARY CANAL.

GENERAL REMARKS.

There are five different species of worms found in the alimentary canal. These are the Ascaris lumbricoides, or round-worm; Ascaris vermicularis, thread-worm, seat-worm, or, as it is popularly called, ascarides; Tricocephalus dispar, or long thread-worm; Tænia solium, and Tænia mediocanellata, the most common varieties of tape-worm; and the Bothriocephalus latus, tænia lata, or broad tape-worm.

We shall give a short description of each of the intestinal entozoa, in order that they may be readily distinguished, but will treat of the causes, symptoms, and treatment only of the first two, inasmuch as the tænias very rarely exist during infancy or childhood, and the tricocephalus is much less frequent than the round and seat-worms, and gives rise to symptoms of the same kind as the former.

Description.—The *Ascaris lumbricoides*, or, as it is commonly called, lumbricoides, lumbricus, or round-worm, is shaped not unlike the common earth-worm, having a cylindrical body, which is attenuated towards either extremity, but particularly the anterior. It varies in length generally between six and twelve inches, and is usually about two or three lines in thickness. The young worm, about an inch and a half long, is rarely met with. The head of the animal is at the smallest extremity, and may be distinguished by a circular depression, around which may be seen three tubercles. When recently voided, the worms are somewhat transparent, so that the viscera may sometimes be seen through the parietes. The integument is marked by circular fibres, and by four lines extending at equal distances from the head to the tail, the former of which indicate the course of the muscles, while the latter indicate that of the vessels and nerves.

The color of the worm is whitish, yellowish, or more or less deep rosy in tint, according to the nature of the aliment they contain; they are, as already stated, somewhat transparent when first voided. The alimentary canal, which may be distinguished by its brownish color, terminates by a transverse opening or anus, situated on the inferior surface of the animal, just in front of its posterior extremity.

The two sexes are in different individuals. The male may be known by its tail, which is shortly curved, while that of the female is straighter and thicker. The genitals of the male consist of a double penis, which their treatment, the reader is referred to any of the standard works on the practice of medicine.

The *Tænia solium* is usually of a whitish color, flat in form, and varying in length from five to ten feet, its ordinary length, to sixty, or even, according to the assertion of some writers, upwards of a hundred. It is uneven in shape, being thick and rounded behind, and measuring three or four lines at its widest part, while it tapers gradually towards the anterior extremity, where it becomes slender and thread-like. The head is minute in size, and flattish in shape, with a projecting papilla in the centre, furnished with a double circle of hooks, and surrounded by four cylindrical apertures, which seem to be the mouths of the animal. The body is composed of numerous segments, which are longer than broad at the posterior part of the worm, and resemble, when separated, the seeds of a gourd, and have hence been called cucurbitani. In this worm the two sexes exist in the same individual.

The *Bothriocephalus latus*, *Tænia lata*, or *broad tape-worm*, is long and flat like the preceding variety, but it is generally thinner and broader, measuring from four to ten lines in breadth. It sometimes attains, like the common tape-worm, to a very great length. It is usually of a dirty-white color, and rather less opaque than the tænia solium. It is distinguished also, says Dr. Wood, from the other tænia, by the shape of the segments, which are broader than they are long; by the form of the head, which is small, elongated, without spines, and divided into two lobes by a longitudinal fossa on each side; and by having, instead of the four mouths of the tænia solium, a single minute pore in the centre, between the fossæ, or else two pores, one at the extremity of each lobe.

The *frequency* of intestinal worms, and their *importance* as a cause of disease, have certainly been, and are still by many physicians, and especially by the public, very greatly exaggerated. There can be no doubt that they do, when they exist in large quantities, and particularly in certain countries, give rise to great disturbances of the digestive organs, and even occasion death; but such instances are, it seems to us, extremely rare, in this city, at least. We are quite sure that we have never as yet met with a case, in our own experience, in which life was at all seriously endangered by their existence,—though we have seen numerous instances in which slight disorders of the digestive apparatus, and various nervous symptoms, generally of very moderate severity, have disappeared after the administration of anthelmintics, sometimes followed, and in an equal number of cases probably, not followed, by the expulsion of worms.

To show the truth of the above remarks, as to the importance of worms as a cause of disease, we make the following quotations: Dr. Rush (*Med. Inquiries and Observations*, vol. i, p. 205), remarks: "When we consider how universally worms are found in all young animals, and how frequently they exist in the human body, without producing disease of any kind, it is natural to conclude that they serve some use-

ful and necessary purposes in the animal economy." M. Guersant
(*Dict. de Méd.*, t. xxx, 669): "It has always been the custom to as
to entozoa much too important an influence upon the diseases of c
hood. In proportion as this part of pathology is perfected, it bec
evident that the greater number of children dying after having
charged worms, or even while having them still, are affected with a
or chronic diseases, which leave after death incontestable traces of
effects, and which are of themselves necessarily fatal." M. Ba
(*Mal. de l'Enf.*, t. ii, p. 100) quotes M. Trousseau as making the fo
ing remarks: "For sixteen years we have not met with a single
who has presented any verminous symptoms; never or almost never
a child born and reared in Paris discharge worms, while just the
trary is true as to the provinces. . . . . Young children, to be sure
sometimes met with in our hospitals, who discharge worms, but
are those who have been born in the country, and have lived i
capital only for a short time." Dr. Condie (*Dis. of Child.*, 2d e
226), remarks: "Worms are a very common occurrence in the intes
of children, and may unquestionably, under certain circumstances
come a cause of severe irritation; but much less frequently th
generally supposed."

We believe we may conclude, therefore, that though these para
are of very common occurrence, and productive of grave disorde
some countries, they are rarely met with in quantities sufficient
serious injury to the health, in other places, as for instance, Paris,
probably in this country, or at least in the northern parts of it.

That intestinal worms do, however, not unfrequently in some
tries, and occasionally in all, produce dangerous and even fatal dis
ances of the health, cannot be doubted after careful perusal of th
dence brought forward by different authorities. M. Guersant, amo
others, remarks (*loc. cit.*, p. 670): "It is nevertheless incontest
that the development of these animals in the gastro-intestinal an
dominal cavities, does sometimes give rise to very varied morbid
nomena, which are in some instances grave enough to cause de
Nevertheless, we are disposed to believe, as stated above, that fat
even dangerous results from the existence of these parasites, are of
occurrence in this city, and probably throughout our Northern S
Dr. Dewees, however, mentions several cases in which they prod
alarming symptoms, and one in particular (*Dis. of Child.*, p. 49
which the subject, a child twenty months old, was extremely e
ated, and whose abdomen was "enormously distended, and semi-t
parent," who recovered rapidly after ninety-six lumbricoides, from
to ten inches long each, had been expelled under the use of pink
in infusion.

ARTICLE I.

ASCARIS LUMBRICOIDES.

THE *description* of this worm has already been given at page 961.

CAUSES.—Under this head we shall not pretend to consider the question of the origin of worms, but only the causes which predispose to their production, or favor their growth.

Age has no doubt a considerable influence upon the predisposition to lumbricoides. According to M. Guersant (*loc. cit.*, p. 685), infants at the breast under six months of age are very rarely affected with them. Instances occasionally occur, but are altogether exceptions to the general rule. Above six months of age, they begin to be met with, but still very rarely, so that scarcely one or two will be found in several hundred children of a very early age; while from three to ten years of age they will be observed in about a twentieth, or in some seasons perhaps in a larger proportion. M. Valleix states that he has never met with them in new-born children. Dr. Dewees says (*loc. cit.*, p. 481), that he has never seen worms in children under ten months old; and in only two instances at that age. We do not recollect ourselves ever to have seen them in subjects younger than eighteen months, and very rarely in those under three or four years.

There can be little doubt that the disposition to worms is *hereditary* in some families. It is generally believed that the species under consideration is more common in *girls* than *boys;* that it is most common in children of *lymphatic* and *scrofulous* constitutions; and that a too exclusively vegetable or milk *diet*, and an abuse of *fruits*, strongly predispose to their production. The *habitation* of a cold and damp, or warm and damp climate, and the *seasons* of summer and autumn, are supposed by many also to favor their production and growth. It is a general belief, and we should suppose from personal experience, a well-founded one, that a feeble and disordered state of the digestive function from any cause, often acts as a predisposing cause of worms, and particularly of lumbricoides.

SEATS.—The small intestine is, in a very large majority of the cases, the seat of the ascaris lumbricoides. They are met with, however, in other parts of the digestive tube, particularly the stomach and large intestine, and more rarely in the œsophagus or pharynx. In some instances they are found to have migrated to other organs, as to the liver, gall-bladder, and in still rarer cases they have passed into the peritoneal cavity, bladder, larynx, trachea, bronchia, and even into the nasal passages and frontal sinuses. They have also been met with occasionally in the walls of the abdomen, forming verminous abscesses, whence they have escaped on the opening of the abscess.

The *number* of ascarides is exceedingly variable; there may be only two or three, ten or twenty, or several hundred. When very numerthe *Biblioth. du Méd. Prat.*, and M. Guersant; while amongst those opposed to this opinion may be cited, MM. Cruveilhier, Barrier, Dr. Arthur Farre, who greatly doubts the possibility of the accident, and Dr. Condie. We confess ourselves inclined to believe, from facts stated by different authors, and from the history of two cases which occurred to M. Guersant in 1841, at the Children's Hospital of Paris (*loc. cit.*, p. 680), that worms may in some instances cause a perforation independently of previous disease of the coats of the intestine. In one of these, two lumbrici were found engaged in an opening in the appendix vermiformis, half the bodies of the animals being in the appendix, and half in the peritoneal sac; while in the other, an opening of the same kind as in the previous case was found in the appendix, and though the three worms which were found lying in the abdominal cavity, might have escaped through an ulcerated perforation of the colon, it is not the less true that the opening in the appendix presented the same characters exactly as in the first case, in which the animals were, as the author remarks, "taken in the act." In both instances, the perforation of the appendix was at the extremity of that canal, and in the form of a narrow opening of a conical shape; the membranes were smooth, thinned, and the edges of the orifice sloped off from within outwards; no trace of anterior ulceration was perceptible.

In regard to the *verminous abscesses* already referred to, we shall make but few remarks, referring the reader to more extensive treatises for fuller information. These abscesses have been, in very rare instances, met with in the pharynx and nasal passages, but much more frequently they exist in the abdomen. The latter may be of two kinds, *stercoraceous* and *non-stercoraceous.* In the former, the abscess, which forms upon some portion of the walls of the abdomen, gives issue not only to the worm or worms, and pus, but also to fecal and even alimentary substances, and leaves behind a fistula connecting with the cavity of the intestine, which may cicatrize after a short time, or remain open during life. In the other form of abscess, the opening through the coats of the intestine has been closed immediately after the passage of the worm, so that the abscess gives issue only to the animal and pus, after which it heals up without giving rise to a fistula.

The verminous abscesses are said to be found generally about the inguinal and umbilical regions; to occur most frequently between the ages of seven and fourteen years, and not to be, as a general rule, very dangerous to life.

SYMPTOMS INDICATIVE OF THE PRESENCE OF WORMS.—We believe it is almost universally acknowledged by later writers, that there is no single symptom, nor group of symptoms, other than the expulsion of the worms, and their detection, which indicate with certainty their existence in the digestive tube. This is the expressed opinion, amongst others, of MM. Guersant, Rilliet and Barthez, Barrier, Valleix, and Drs. Eberle and Condie, and it is also the opinion which we have ourselves been led to form from our experience amongst children.

Another point worthy of remark is, that even though one or several toms just described may exist independently of the presence of worms, the only certain sign of which is their expulsion from the patient.

MORBID EFFECTS OCCASIONED BY WORMS.—MM. Rilliet and Barthez divide the accidents or effects produced by the existence of lumbricoides into two groups: those which result from the mechanical influence of the entozoa, as their accumulation or displacement; and those which appear to be the consequences of a purely sympathetic action on the different systems of the body, and particularly the nervous system.

MECHANICAL EFFECTS.—Under this head are included perforation and hemorrhage of the intestine, enteritis, abscesses, and the symptoms determined by the displacement or migration of the worms into the ductus communis choledochus, the liver, or the air-passages.

Of perforation and abscesses, we have already treated under the head of anatomical lesions. Hemorrhage is a very rare event, but it occurred in one instance cited by MM. Rilliet and Barthez, and Guersant, from M. Charcelay, in consequence of the rupture of an arteriole in a small rounded ulceration in the duodenum, apparently occasioned by the presence of a large number of lumbrici. Enteritis, as an effect of the presence of worms, has also been referred to under the head of the anatomical lesions. In many instances it is, no doubt, a mere accidental complication, in no way connected with the presence of entozoa; probably this is true of a large majority of the cases. When, however, the number of the parasites is very great, and particularly when they are collected into large or firm knots and bundles, they may, no doubt, occasion, by their mechanical irritation, inflammation, thickening, softening, and even destruction of the mucous tissue, as in cases cited by M. Guersant, from MM. Bretonneau and Charcelay, and in one which occurred to himself. It should be remarked, however, that the cases on record in which ulcerations evidently depended upon the presence of worms, are, so to speak, infinitely few in comparison with those in which no such alteration existed, or in which it was evidently independent of any influence exerted by the worms.

EFFECTS CAUSED BY THE DISPLACEMENT OR MIGRATION OF WORMS.—Lumbricoides have been found, as we have already seen, in the walls of the abdomen, giving rise to abscesses. They have been discovered, also, in the vermiform appendix, in the ductus communis choledochus, in the gall-bladder, in the hepatic ducts in the substance of the liver, forming abscesses, and in the pancreatic canal. The symptoms occasioned by the latter class of cases are very obscure. In one instance, M. Guersant supposed that an attack of convulsions depended upon the presence of worms in the common duct.

More numerous examples are on record, in which violent dyspnœa and cough, and fatal asphyxia, have occurred in consequence of the pressure of lumbricoides which had passed into the œsophagus, or from their introduction into the larynx, trachea, or bronchia. The symptoms occasioned by these accidents are a sudden attack of dyspnœa, anxiety, agitation, threatened suffocation, dry, spasmodic cough, acute painful cries, pain in the larynx or trachea, and, unless relief be obtained in a few hours, death. This kind of attack may depend on the rising of a worm or bundle of worms into the œsophagus, causing pressure on the larynx and trachea, as in the case reported by M. Tonnelle, in which the symptoms disappeared after the expulsion of a large number of worms. One of us has met with an instance of this kind. It occurred in a boy fifteen years old, presenting every mark of strong and vigorous health, but who, for three or four weeks before we were consulted in regard to him, had been subject to sudden and apparently causeless attacks of suffocation, which seized him without the least warning. When the attack came on, he would for some instants cease to breathe, or breathe with much difficulty. He always seemed to suffer from the greatest anxiety; the countenance became altered and distressed; he was unable to speak, but made signs for water, and when able to swallow a mouthful, which was always exceedingly difficult, was at once relieved. His mother told us that he always appeared to be in the greatest distress, so that, on several occasions, she feared for his life. Striking him violently on the back, which she, when present, always did, sometimes relieved him, but generally the difficulty continued until he could swallow a little fluid of some kind. These attacks were unattended at the time by cough, nor was there the least sign of disorder of the respiratory system in the intervals between them. Suspecting that the difficulty must depend on the rising of a worm or worms into the œsophagus, or upon sympathetic irritation from the presence of these parasites in the stomach, and learning that he had been troubled with worms some years previously, we gave him wormseed oil, which caused the expulsion of a few large lumbricoides, after which he had no return of the symptoms.

The attacks of dyspnœa may depend also, as already stated, on the introduction of worms into the air-passages. Under these circumstances death is very apt to be the result. In one instance, however, reported by M. Arronsshon, after the difficulty had lasted two hours, the patient, a little girl eight years old, after violent efforts at coughing, threw up a living lumbricus.

We have next to consider the *sympathetic effects*, and particularly the *nervous symptoms*, occasioned by worms. We may include amongst the nervous symptoms produced by worms the headache, languor, irritability, restless and disturbed sleep, and grinding of the teeth, so frequently observed. These, however, are of but slight importance in comparison with certain other disorders of the nervous system, which do undoubtedly occur sometimes, though we should suppose *very rarely*, in proportion to the whole number of subjects affected with the parasites. The disorders to which we allude are partial or general convulsions, chorea, hysteria, and catalepsy, which are the most frequent, though, as so often stated already, extremely rare in comparison with the number of cases in which the presence of the worms produces no such effects. Other disorders cited by the authors of the *Bib. de Méd. Prat.*, with cases to prove their reality, are insanity, paralysis, coma, palpitations, strabismus, cough, hyperæsthesia of the skin, amaurosis, and aphonia.

Diagnosis.—It has already been stated that there are no certain signs of the presence of worms in an individual except their expulsion. The symptoms which have seemed to us most strongly to indicate their presence are, a chronic disordered state of the digestive apparatus, producing irregular appetite, which is sometimes good and at others bad; slight emaciation; paleness or unhealthy tint of the complexion; languid expression of the face; some irritability of the temper, or a want of the gayety and activity of disposition natural to childhood; picking at the nose; often some tumidity of the abdomen, which may be at the same time either hard or merely tympanitic; and, what seems to us more important than any that we have named, very restless and broken sleep at night, with frequent grinding of the teeth.

M. Valleix remarks that, in a case presenting nervous symptoms simulating disease of the brain, we may suspect the existence of worms, if we learn upon inquiry that symptoms of marked intestinal disorder, the various signs cited above as indicative of the presence of worms, and different derangements of digestion, had preceded for some time the appearance of the nervous symptoms; chiefly for the reason that, in most diseases of the brain, the digestive tube is, at the invasion, in a state of integrity, with the exception of sympathetic vomiting. If we can learn, upon inquiry, that the child has discharged worms on some previous occasion, the probability of the dependence of the symptoms upon them becomes still stronger.

It is sometimes difficult to determine positively whether certain substances discharged at stool are fragments of worms, or whether they are portions of imperfectly digested aliment, or foreign bodies. The things which most resemble lumbricoides, are the remains of tendons, ligaments, vessels, fibres of plants, &c. To make the distinction with certainty, the doubtful substance ought to be placed in water, so that it may be thoroughly cleansed, after which it must be carefully examined as to its structure, arrangement, consistence, &c., with the eye, and with the microscope, if necessary. M. Guersant has suggested a very easy method of ascertaining whether the substance be animal or vegetable, which is to subject it to heat, after it has been carefully washed, when the odor will at once inform us of its real nature.

Prognosis.—It is no doubt a very rare event, at least in the northern parts of our country, for life to be endangered by the presence of worms. We have never, ourselves, met with an instance in which the general health was more than moderately disturbed by this cause. That verminous affections are sometimes, however, dangerous to life in this city, is shown by three cases related by Dr. Dewees, in which very severe and threatening symptoms were instantly relieved upon the expulsion of lumbrici after the exhibition of vermifuges.

Worms become dangerous to life when they migrate from their original seat to neighboring and important organs, particularly the air-passages and liver. The prognosis is unfavorable also when they tive mucous membrane, and produces dangerous nervous symptoms. We know of one case, in which a girl six or seven years of age was made exceedingly ill, and suffered for years afterwards, from the effects of a teaspoonful of the oil given by mistake. The following is a very good formula for the administration of this remedy:

℞.—Ol. Chenopodii, ...	gtt. lx vel fʒj.
P. G. Acaciæ, ...	ʒij.
Syrup. Simp., ...	f℥j.
Aq. Cinnamom , ...	f℥ij.—M.

Give a dessertspoonful three times a day, for three days, and repeat after several days.

The wormseed may be given also in powder, in the dose of from twenty to forty grains.

The remedies most frequently employed in this country besides the wormseed, are pink-root or spigelia, oil of turpentine, calomel, and the bristles of cowhage.

We believe that the *pink-root* is more depended upon amongst us than any other single remedy. It is given either in substance or infusion. The dose of the powder is from ten to twenty grains for a child three or four years old, to be repeated every morning and evening for several days, and followed by an active cathartic. The powder is seldom used, however, as the drug is almost always given in infusion. The best and safest mode of administering it is in combination with cathartic substances. Thus, half an ounce each of pink-root and senna may be infused for a few hours in a pint of boiling water, and a tablespoonful given two or three times a day to children two or three years old, for three, four, or five days, when it should be suspended for a time, and resumed, if necessary. A preparation much used in this city under the title of worm-tea, and which we have ourselves given with very good success, consists of the spigelia mixed with senna, manna, and savine, in different proportions, made into an infusion and sweetened with brown sugar. Dr. G. B. Wood (*Pract. of Med.*, vol. i, p. 626) recommends the following formula:

℞.—Sennæ, Spigeliæ, ...	āā ℥ss.
Magnesiæ Sulphat., ...	ʒij.
Mannæ, ...	℥j.
Fœniculi, ...	ʒj.
Aquæ Fervent., ...	Oj.

These are to be macerated for two hours in a covered vessel, and a tablespoonful given to a child two years old once or twice a day, or every other day, so as to procure two or three evacuations in the twenty-four hours. The remedy is continued for a few days, or for one or two weeks, if necessary, and if it do not debilitate the child.

The fluid extract of spigelia and senna has been introduced as a more convenient and acceptable mode of administering this vermifuge with a cathartic. The dose for a child is from thirty minims to a teaspoonful, according to the age.

The *spirit of turpentine* is highly recommended as an efficient rem for worms by several authorities, and particularly by Dr. Joseph Kl and Dr. Condie, of this city. Dr. Condie states that it is the ar from which he has derived the most decidedly beneficial effects, remarks that it may be given when there exists considerable irrita of the alimentary canal, or even subacute inflammation, without fear of its increasing either. He gives the rectified spirit in sweete milk, in molasses, or in the following mixture:

℞.—Mucil. G. Acaciæ,	f℥ij.
Sacch. Alb.,	ʒx.
Spir. Æther. Nitr.,	fʒiij.
Ol. Terebinth.,	fʒiij.
Magnes. Calcinat.,	℈j.
Aquæ Menthæ,	f℥j.—M.

Of this mixture a dessertspoonful is given every three hours.

We have used the spirit of turpentine but seldom, on account of it tremely disagreeable taste, having always succeeded perfectly well the wormseed oil, or with infusion of pink-root with cathartics.

Calomel also is highly thought of by many persons as a vermi and, no doubt, when used in combination with or followed by cat tics, or given in full purgative doses, it is very effectual. We can repeat what we have already said on several occasions, that it remedy which, from the powerful influence it exerts upon the co tution, ought not to be given except when really called for; and, a can almost always succeed in curing verminous affections by mi drugs, we see no occasion for resorting to this, except in rare c When used it is given alone in considerable doses, and followe some cathartic, or in combination with rhubarb and jalap, or jala scammony.

The bristles or down of *cowhage* are also used by some practitio no doubt sometimes with success. We have never used them, and give no opinion, therefore, from personal experience, as to their cacy. They are administered by making them into an electuary honey, syrup, or molasses, a teaspoonful of which is given every m ing for three days, and then followed by an active cathartic.

The following *electuary*, recommended by Bremser, is very much ployed in Europe, and is highly spoken of by Dr. Eberle:

℞.—Semin. Santonicæ (semen-contra of the French writers),	
Semin. Tanaceti rude contus.,	āā ℥ss.
Valerian. pulv.,	ʒij.
Jalapæ pulv.,	ʒjss.–ij.
Potass. Sulphat.,	ʒjss.–ij.
Oxymel. Scillæ,	q. s.—ut ft
Electuarium.	

A teaspoonful of this is given morning and evening for three or days, when the dejections generally become more copious and li If it do not produce this effect, Bremser advises that the dose b creased. Dr. Eberle gave it for six or seven days, and says it does far less good when it produces frequent and watery evacuations, than when it causes only three or four consistent stools a day. This preparation has a very disagreeable taste, and children sometimes refuse to take it on that account. When this is the case it may be made into pills.

MM. Rilliet and Barthez recommend the following *syrup*, which was proposed and highly thought of by M. Cruveilhier:

℞.—Follicul. Sennæ, Rhei, Semin. Santonic, Artem. Abrotan.,
Helminthocort., Tanaceti, Artemis. Pontic, . . . āā ʒj.
To be infused in half a pint of cold water, strained, and made into a syrup with sugar, of which a tablespoonful is to be given every morning for three days.

M. Cruveilhier states that this syrup has been very successful in his hands. Of late years, santonin, the active principle derived from the European wormseed, has been much employed, and with very good success. The remedy may be given in doses of from gr. ij to gr. v, combined or followed by a dose of castor-oil or senna. The *empyreumatic oil* of Chabert is also highly spoken of by some European authorities. It is made by mixing one part of the empyreumatic oil or fetid spirit of hartshorn, with three parts of spirit of turpentine, and allowing them to digest for four days. The mixture is then put into a glass retort and distilled in a sand-bath until three-fourths of the whole have passed over into the receiver. The product should be kept in small and tightly-closed vials. The dose is about fifteen or twenty drops three or four times a day, for children between two and seven years old. This is recommended highly by Bremser and other authorities. The great objection to it is its exceedingly nauseous taste. Dr. Eberle speaks in very favorable terms of a strong decoction of *helminthocorton* or Corsican moss, which he has found "not only valuable as a vermifuge, but particularly so as a corrective of that deranged and debilitated condition of the alimentary canal favoring the production of worms." An ounce of helminthocorton, with a drachm of valerian, are to be boiled in a pint of water down to a gill, and a teaspoonful of the decoction given morning, noon, and evening. It is particularly beneficial in cases attended with the usual symptoms of worms, connected with want of appetite and mucous diarrhœa, and arising from debility of the digestive organs, and a vitiated condition of the intestinal secretions.

Kameela, the reddish-brown powder which clothes the capsules of the Rottlera tinctoria, has been of late highly recommended, not only in cases of tænia, but of ascaris lumbricoides.

The dose for children is about gr. v, repeated till it has acted on the bowels.

In all cases of deranged health supposed, either from the nature of the symptoms, or proved by the previous expulsion of worms, to depend on the presence of these animals in the alimentary canal, it is exceedingly important to attend to the *hygienic treatment* of the child, and in some instances to administer *tonics* and *stimulants*. In not a few cases that have come under our own notice, in which many of the symptoms supposed to indicate the presence of worms have been extremely well marked, we have succeeded in removing them all without a resort to any vermifuge, by the treatment proper for the chronic indigestion or dyspepsia of children. The method of treatment to be employed in such cases has already been laid down in the article on indigestion, to which the reader is referred for full information. It should consist chiefly in strict attention to exercise and diet, and in the use of tonics, as quinia and iron, and small quantities of fine port wine.

Whenever any complication exists in connection with worms, the treatment must be modified according to its nature. If it consist in inflammation of any part of the digestive tube, the inflammation ought to be attended to first, and the verminous disorder for the time neglected. If the inflammation be very slight, or if the symptoms indicate only severe irritation rather than positive inflammatory action, we may exhibit the milder and least injurious vermifuges, as very small doses of wormseed oil, which we have never known to do harm, the decoction of helminthocorton and valerian, recommended by Dr. Eberle, or, according to Dr. Condie, the spirit of turpentine. If the verminous affection coexist with any of the acute local inflammations of the thorax, the former ought to be, as a general rule, neglected, until the latter has been relieved by appropriate treatment. In doubtful cases, in which it is impossible to ascertain with certainty whether the symptoms depend on worms, or upon a simple dyspeptic condition of the digestive organs, it is most prudent to give only the simplest and least irritating vermifuges, to regulate the hygienic conditions of the patient, and afterwards to resort to tonics, if necessary.

Various writers, and particularly M. Guersant, advise that we should forbid, in verminous cases, the use of relaxing food, especially of milk preparations, fruits, and of fatty and farinaceous substances; and that, after the expulsion of the worms, we should direct a tonic and strengthening regimen. The diet should consist of boiled and roasted meats, of wine, and of bitters. The author just quoted, states that a change of food alone will often suffice to procure the expulsion of worms. He says (*Dict. de Méd.*, t. xxx, p. 689), "I have met with children who had been tormented with ascarides lumbricoides while residing in the country and living upon milk and fruits, and who, upon being brought to the city, and put upon the use of broths and soups, passed considerable quantities of worms, and after that got entirely rid of them."

Occasionally our opinion is asked with reference to worms of other varieties, which are reported to have been passed from the rectum of children. Thus, tapering elongated pieces of coagulated casein may be mistaken for worms.

So, too, we have seen a specimen, submitted to us by Dr. Bussey, of Buena Vista, Texas, and said to have been passed by a boy there, of male Gordicus aquaticus, or horse-hair worm. This is a nematoid worm, of chestnut-brown color, a foot in length, a little more than one-half line in breadth, with a bifid caudal extremity. It grows in stagnant water, and thus may readily have been swallowed and passed per anum.

ARTICLE II.

ASCARIS VERMICULARIS.

The *description* of this worm has already been given at page 962.

SEAT.—The ascaris vermicularis is found almost exclusively in the large intestine, and in a large majority of the cases is confined to the rectum. It is said to have been found in the vagina in the female, having no doubt passed from the rectum into that canal.

The *causes* which determine the presence of this worm are not at all understood.

SYMPTOMS.—The characteristic, and often the only symptom indicative of their presence, is violent itching about the anus, which is sometimes almost insupportable, and which is generally most troublesome and most apt to occur at night when the child is in bed. In some instances they give rise to acute and violent pain in the region of the anus, and sometimes to tenesmus and mucous or bloody stools. When the last-named severe symptoms exist, the worms may occasion dangerous nervous disorders, and even give rise to general convulsions. The worms not unfrequently escape from the rectum and are found upon the bed-clothes, or upon the clothes which the child has worn through the day. Sometimes they are discharged in considerable numbers, and are found in that case, either mixed with the fæces, or with mucus, or collected into balls or knots.

The *diagnosis* of the seat-worm, like that of the lumbricoides, cannot be regarded as positive, unless some have been expelled, or unless they can be seen by examination of the rectum. This can generally be done when they are present in any number, by pressing the nates apart so as to open the anus and bring the folds of the mucous coat of the bowel into view. The only other symptom which indicates their presence with any certainty, is the existence of severe itching about the anus, not to be explained upon any more reasonable supposition.

PROGNOSIS.—These worms do not, as a general rule, produce the same disturbances of the general health as lumbricoides, and in not a few instances are entirely innocuous, with the exception of the pain and inconvenience they occasion.

They are, however, exceedingly troublesome, because of the difficulty of removing them entirely by any treatment. No matter how many are discharged, some almost always remain concealed in the folds of the mucous membrane, and as they are propagated with great rapidity, the same train of symptoms is very apt to return soon after they may have been seemingly dislodged.

TREATMENT.—It has been found by long experience that the common vermifuges, given by the mouth, exert much less influence in causing the expulsion of these worms than of the lumbricoides. For this reason enemata are generally resorted to in the treatment, instead of

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